

REPORT OF THE COMMITTEE ON MANAGERIAL PERSONNEL



MINISTRY OF EDUCATION • GOVERNMENT OF INDIA

आदर्श एन. ए. ए. ए. ए. ए.

Publication No. 727



सत्यमेव जयते

GOVERNMENT OF INDIA

PRINTED IN INDIA BY THE MANAGER, GOVERNMENT OF INDIA PRESS, FARIDABAD

CONTENTS

CHAPTER I	PAGE
Terms of Reference and Definitions	1
CHAPTER II	
Requirements of Managerial Personnel for Manufacturing Industries	5
CHAPTER III	
Managerial Personnel Requirement for Sectors other than Industry ..	15
CHAPTER IV	
Management Cadres and Present Training Facilities	20
CHAPTER V	
Requirements of Managerial Personnel for the Third and Fourth Plans and Provision of Increased Facilities for Training in Management	25
APPENDIX I	
Copy of d.o. letter No. F. 10-15/60-T2 dated 30-10-61 from Dr. A. Ramaswami Mudaliar, Chairman, Committee for Assessment of Management Personnel, addressed to various Industrial Firms ..	29
APPENDIX II	
Summary of Replies Received (Industry-wise) Regarding Number of Persons Employed and Number of Managerial Personnel Classified under various Categories	40
APPENDIX III	
Location-wise Distribution of Industries Pertaining to Mechanical and Electrical Machinery, Equipment and Managerial Personnel Required for their Contemplated Development	43
APPENDIX IV	
Copy of d.o. letter No. F. 10-15/60-T2 dated 18th Sept. 1962 from Dr. A. Ramaswami Mudaliar, Chairman, Committee for Assessment of Management Personnel addressed to various Commercial Firms ..	59
APPENDIX V	
Charts Showing Organisational Set-up of Two Industrial Establishments	61
APPENDIX VI	
Post-Graduate Course in Industrial Engineering—Syllabus of Studies Approved by the Board of Technical Studies in Management ..	65
APPENDIX VII	
Part-time Course in Foremanship and Supervision—Syllabus Approved by the All-India Board of Technical Studies in Management ..	74

CHAPTER I

TERMS OF REFERENCE AND DEFINITIONS

At its meeting held on the 27th August, 1960, the All India Board of Technical Studies in Management set up a Committee under the Chairmanship of Dr. A. Ramaswami Mudaliar to assess the requirements of managerial personnel for the country's development programme in the private and public sectors with the following membership :

Dr. A. Ramaswami Mudaliar	..	..	..	..	Chairman
Dr. V. K. R. V. Rao	..	..	..	..	Member
Dr. M. V. Mathur	..	..	..	..	Member
Shri R. Prasad	..	..	..	..	Member
Shri Pitambar Pant	..	..	..	..	Member
Shri K. Khosla	..	..	..	..	Member
Sri Y. A. Fazalbhoj	..	..	..	..	Member
Prof. A. Das Gupta	..	..	..	..	Member
Shri M. V. D. Nair	..	..	..	..	Member-Secretary

The Committee held four meetings, two at New Delhi, on 23rd September, 1960, and 10th June, 1962, and two at Calcutta on 11th December, 1963 and 3rd September, 1964. It has taken about four years to finalise the Report. This was primarily due to the fact that this is the first time that an effort is being made to estimate the requirements of managerial personnel. The Committee had therefore to devise its own norms and yardstick for assessment. The first questionnaire though it yielded excellent results in regard to Industry proved unsuitable for Commerce, Trade, Banking and other sectors. A fresh questionnaire had to be devised for these categories and this took time. Further one year was almost wasted, as following the declaration of Emergency no work could be done.

In an industrial establishment "Management functions" are exercised in varying degrees from the lowest supervisor to the topmost executive. Supervisory personnel carrying out routine technical operations fell outside the scope of the work of the Committee. The term 'Manager' could better be defined in terms of his functions and position of responsibility. The major managerial functions are generally as under :

1. General Management
2. Production
3. Sales
4. Research and Engineering
5. Finance
6. Law
7. Personnel
8. Public Relations

9. Traffic
10. Office Management
11. Purchasing
12. Plant Management

A Manager is, therefore, a person who carries out one or more of the above functions.

The production functions may be stated to have the following content in general :

1. Design and construction of plants.
2. Planning and justifying plant capital expenditure.
3. Supervision of production orders received.
4. Promise of delivery schedule of manpower equipment and material flow, coordination with sales.
5. Planning of the production flow and assignment of orders.
6. Supervision of production.
7. Development of production controls, such as
 - (a) Coordination with marketing and engineering.
 - (b) Quality control.
 - (c) Control of over-all production, machine and manpower performance, purchasing, design of plant and product, plant maintenance, inventory, industrial relations, research, traffic, safety, engineering and industrial engineering.

The content makes it clear that managerial training is essential for production personnel.

In pursuance of the decision taken at the first meeting, letters were sent to important industrialists, both in the public and private sectors, Managing Directors of Banks and commercial organisations, to obtain information necessary to assess the requirements of managerial personnel for the country's planned development. A copy of the letter and the questionnaire on managerial personnel enclosed therewith and the list of persons addressed may be seen at Appendix I. The letter conveyed that the purpose of the enquiry was to assess the requirements of managerial personnel who may be trained in the theory and practice of management, with a view to determine the extent of facilities that should be organised in the country for the training of such personnel. To enable this to be done, information was sought on the existing managerial personnel in the following fields of management :

- (a) **Technical Management** comprising Production Management, Development Management and Transport Management.
- (b) **Commercial Management** comprising Distribution Management, Sales Management and Financial Management.
- (c) **General Management** comprising Office Management, Personnel Management and General Management.

It was also pointed out that the Board of Technical Studies in Management had organised courses of study in Business Management and Industrial Management for persons working in industrial and commercial establishments who were graduates in Engineering, Science and Arts and who had a minimum of two years' requisite supervisory experience. Suggestions were also sought as to additional centres which should be organised for providing facilities for training in management. Comments too were invited on the steps to be taken to promote management education.

At Appendix II may be seen the summary of the replies received, industry-wise. The summary gives information about the total number of persons employed in the industry, number of managerial personnel classified under production management, general and commercial management and percentage of managerial personnel to the total persons employed. It would be seen that these percentages vary very widely. This is due to the fact that the relative importance of requisite abilities of managerial personnel in industrial concerns generally varies with the size of the concern. The great French Industrialist, Henry Fayol, has drawn up a chart of the requisite abilities in the various types of concerns. These are as follows :

	<i>Requisite Abilities</i>						<i>Total Evaluation %</i>
	<i>Managerial %</i>	<i>Technical %</i>	<i>Commercial %</i>	<i>Financial %</i>	<i>Security* %</i>	<i>Accounting %</i>	
One-man business	15	40	20	10	5	10	100
Small firm	25	30	15	10	10	10	100
Medium-sized firm	30	25	15	10	10	10	100
Large firm	40	15	15	10	10	10	100
Very large firm	50	10	10	10	10	10	100
State enterprise	60	8	8	8	8	8	100

From this table the following conclusions may be drawn :

- (1) The most important ability of the head of the small industrial company is technical ability.
- (2) In medium-size industries, managerial ability increases and that of technical ability declines.
- (3) In large-scale industries the managerial coefficient increases at the expense of the rest, which tend to even out, approximating up to one-tenth of the total evaluation.

Apart from the size, there are other factors which decide the number of managerial personnel in a concern. Two of these are: (1) competitive nature of the product; (2) end use of the commodity.

In the case of a competitive commodity, there are several establishments producing the same goods and large number of managerial personnel will have to be employed for the proper organisation of sales and services. Consumer industries employ a larger number of managerial personnel than industries manufacturing raw materials and chemicals required for industry itself.

*Safeguarding property, avoiding social disturbances in the broad sense and any influence endangering the life of the business.

An important factor that has to be taken note of in estimating the facilities required for the training of managerial personnel is that even if no facilities are provided, the industrial targets of production aimed at and the expansion of trade, commerce, construction and transportation will not be physically affected though efficiency would be markedly less. The fundamental principles of organisation and administration which are common to different types of activities can be taught and should be taught. They can also be laboriously acquired by individuals by a process of trial and error. In Indian Industry at present, it is by this trial and error method that principles of management are imbibed by the large majority of persons in managerial positions. There are many countries in the world where even today there are no specially organised educational facilities for training in management and yet these countries have reached commendable industrial levels. The management movement in the country is in its infancy and better organisation of industrial production and business efficiency would ultimately depend on the success of the movement.



CHAPTER II

REQUIREMENTS OF MANAGERIAL PERSONNEL FOR MANUFACTURING INDUSTRIES

The first step in the assessment of managerial personnel is the estimation of the managerial norm. The managerial norm is the over-all percentage of the number of managerial personnel to the total number of persons employed.

The managerial norms have to be fixed in relation to a particular point of time. The commencement of the Third Plan has been taken as the point of time for the purpose of calculation in this Report. Modern techniques of production, rationalisation, and increased efficiency would tend to lower manpower requirements. Consequently there would be an automatic reduction in managerial personnel requirements also.

A change-over from a medium-sized industry to a big-sized industry, would increase the requirements of managerial personnel by 20 per cent. If an industry is nationalised, a still higher percentage of managerial personnel would be required. To the extent possible, these considerations have been taken note of in fixing norms for the industry. The managerial norm for a particular industry or type of industry is decided on the basis of replies furnished to the questionnaire with such modifications as may be necessary taking into consideration the size of the concern and other relevant factors.

The following are the managerial norms for the various industries :

Name of the Industry	Norms for Technical Management	Norms for General and Commercial Management
1. Industrial machinery	0.5%	0.5%
2. Equipment manufacturing industries	0.5%	0.5%
3. Iron & steel	0.38%	0.27%
4. Aluminium	0.5%	0.5%
5. Copper, lead and zinc	0.5%	0.5%
6. Precision instruments (industrial and scientific)	1%	1.2%
7. Surgical instruments	1%	0.7%
8. Automobile and ancillary industries		
Passenger cars, commercial vehicles, jeeps & station wagons	0.65%	0.45%
Sewing machines	0.4%	1.1%
Bicycles	0.4%	1.1%
Ship building expansion of Hindustan Shipyard and Second Shipyard Dry Docks	1.5%	0.5%
9. Fertilizers	0.5%	0.5%
10. Cotton textiles	0.3%	0.3%
11. Salt	0.4%	0.2%
12. Vanaspati	1%	1%
13. Paper and paper board	1%	1.5%
14. Cement	0.22%	0.33%
15. Glass & glassware	0.9%	1.00%
16. Soap	0.5%	1%
17. Synthetic rubber	1.26%	1.84%
18. Plastics	1%	0.5%
19. Refractors	1%	1%
20. Power & industrial alcohol	1%	1%
21. Industrial gases	0.9%	2.8%
22. Petroleum products crude oil	1%	2%

The requirements of management personnel industry-wise are indicated below.

Industrial Machinery/Equipment Manufacturing Industries

From the analysis of the figures of employment and production in the following industrial establishments, it has been deduced that for every crore of output the number of persons employed is 800 :

1. Hindustan Cables Limited
2. Chittaranjan Locomotive Works Limited
3. Ashok Leyland Limited

In regard to three items, however, viz., Machine Tools, Gear Industry and Ceramic Refractories, this ratio does not apply as these industries employ more persons per crore of production. From the figures furnished by the Hindustan Machine Tools Limited, the Indian Telephone Industries Limited, etc., it was observed that this type of industry requires 1,000 persons for every crore of production.

The managerial norm for the industry is 0.5% for Technical Management and 0.5% for General and Commercial Management. The following is the statement indicating the additional management personnel required for achieving the targets of production indicated in the third Plan.

Sl. No.	Industry	Production 1960 (Rs. crores)	Tentative Estimated Production (1965) (Rs. crores)	No. of Persons in Employment in 1960	Estimated Additional Employment	No. of Managerial Personnel Required	
						Tech. Management	Genl. & Commercial Management
1	2	3	4	5	6	7	8
A.	Industrial machinery and equipment manufacturing industries :						
1.	Paper making machinery ..	Negl.	7.0	Negl.	560	3	3
2.	Sugar mill machinery ..	4.2	12.0	3,360	6,240	31	31
3.	Cement machinery ..	0.6	8.0	5,480	5,760	30	30
4.	Boiler machinery ..	0.5	30.0	400	23,600	120	120
5.	Textile machinery						
	Cotton textile machinery ..	11.0	21.0	8,800	8,000	40	40
	Jute mill machinery ..	2.2	2.5	1,760	240	3	3
6.	Coal mining, oil and other mining machinery and equipment						
	Coal mining, oil & other mining machinery etc.	Negl.	15.0	Negl.	12,000	60	60
	Coal washeries ..	"					
7.	Structural (fabrication) and cranes						
	(i) Structural	20.0	100.0	16,000	64,000	320	320
	(ii) Cranes	0.5	15.0	400	11,600	55	55

1	2	3	4	5	6	7	8
8.	Tractors and earth moving equipment						
	(i) Agricultural tractors and implements ..	0.2	15.0	160	11,840	60	60
	(ii) Earth moving machinery and equipment ..	Nil	12.5	Nil	10,000	50	50
	(iii) Road rollers ..	1.5	3.0	1,200	1,200	6	6
9.	Chemical plants ..	1.4	20.0	1,120	14,880	75	75
10.	Power driven pumps ..	3.0	3.0	2,400	1,600	8	8
11.	Diesel engines ..	8.2	20.0	4,950	7,050	35	35
12.	Printing machinery ..	Negl.	1.6	Negl.	1,280	6	6
13.	Dairy machinery ..	0.2	2.3	160	1,680	8	8
14.	Gear industry ..	0.1	2.1	120	2,400	14	14
15.	Building and construction machinery ..	1.0	4.0	800	2,400	14	14
16.	Tea processing machinery ..	1.2	1.5	960	250	3	3
17.	Machine tools ..	10.0	45.0	10,000	35,000	175	175
18.	Compressors ..	1.5	5.0	1,200	2,800	15	15
19.	Industrial flour mill machinery ..	Nil	0.3	Nil	250	3	3
20.	Ceramics and refractory ..	0.1	0.6	160	800	4	4
21.	Locomotives, wagons and railway equipment.						
	(i) Locomotives ..	13.0	17.0	18,000	5,500	28	28
	(ii) Railway wagons ..	8.1	20.0	6,560	9,520	48	48
	(iii) Coaches ..	22.9	65.7	9,000	9,000	45	45
	(iv) Railway stores and equipment ..	21.6	61.5	21,600	40,000	200	200
22.	Conveyers and other material handling equipment ..	1.3	7.7	1,040	5,120	26	26
23.	Steel plant machinery ..	Nil	5.0	Nil	4,000	20	20
	Total ..	114.3	465.3	—	—	1,505	1,505
B.	Electrical machinery and equipment manufacturing industries						
1	Electric motors ..	8.3	25.0	6,640	13,360	67	67
2.	Transformers ..	6.6	20.0	5,180	10,720	54	54
2.	Switch gear and control gear	4.0	15.0	3,200	8,800	44	44
4.	Cables and wires ..	27.0	75.5	33,600	38,800	190	190
5.	Heavy electrical machinery and equipment ..	Nil	35.0	Nil	28,000	140	140
	Grand Total A & B ..	160.2	635.8	164,250	408,170	2,000	2,000

Iron and Steel Industry

Tata Iron and Steel Company Ltd., has been taken as the representative firm in this category. In 1960-61 this firm produced about 2 million tons of steel ingots and had a labour force of 38,000. On this basis, the then existing total labour force in the Steel industry was 66,500. The total additional labour force for the production of additional 6.7 million tons of steel will, therefore, be 126,550. The managerial norm for iron and steel production is 0.38% for technical management and 0.27% for general management.

This managerial norm applies to all types of production in this category. The additional 6.7 million tons will be distributed as follows :

	Millions
Bhilai	2.0
Rourkela	1.8
Durgapur	1.6
Mysore Iron & Steel Works	0.1
Bokaro	1.0
Private sector (Tata Iron & Indian Iron)	0.2
	<hr/> 6.7 <hr/>

The additional managerial personnel required for technical management is 483 and for commercial management is 335 for achieving this target.

Applied Tool and Special Steel

40,000 tons of applied tool and special steel were produced by the end of 1960-61. By 1965-66, it is expected that production would be of the order of 200,000 tons. The additional capacity will be in the following centres :

	Tons
Durgapur plant	100,000
Ordnance Factory, Kanpur	25,000
Ordnance Factory, Ishapur	25,000
Private industry	10,000
	<hr/> 160,000 <hr/>

For production of 25,000 tons of special steel, four managerial personnel under Technical Management and three for General Management is required. This would be the minimum irrespective of the tonnage produced. The total requirements of management personnel in this category is 28 for Technical Management and 18 for General and Commercial Management.

Grey Iron Castings, Steel Castings and Steel Forging

About 700,000 tons of grey iron castings, steel castings and steel forging were produced by the end of 1960-61. The third Plan targets for these are 1.2 million tons of grey iron castings and 200,000 tons each for steel castings and steel forging. The following is the distribution of additional centres :—

	Steel Castings	Grey Iron Castings	Steel Forging
	Tons	Tons	Tons
Forge and Foundry, Ranchi	45,000	38,000	69,700
Durgapur Mining Machinery Plant	6,000	11,000	7,000
Hindustan Machine Tools, Bangalore	—	6,000	—
Durgapur, Bhilai, Rourkela	15,000	75,000	—
Chittaranjan Loco	10,000	3,000	—
Foundries attached to Railway Workshops	—	6,000	—
	<hr/> 76,000 <hr/>	<hr/> 139,000 <hr/>	<hr/> 76,700 <hr/>

The following will be the share of the private sector :

Steel Castings	74,000 tons
Steel Forgings	88,300 tons

On the basis of managerial norms as for special steel, the additional managerial personnel required is 100 for technical management and 75 for commercial and general management. The total managerial personnel required for Iron and Steel Industry to achieve the planned target of production is 631 for technical management and 428 for general and commercial management.

Non-Ferrous Metals

In this category are aluminium, copper, lead and zinc. The following table gives the actual production in 1960-61, estimated production in 1965-66, number of persons in employment in 1960-61, additional persons required for development and the additional managerial personnel for technical management and general commercial management.

Name of Industry	Pro- duction 1960-61	Pro- duction Estimated 1965-66	Number of Persons Employed 1960-61	Addi- tional Number of Persons Required	Additional Number of Managerial Per- sonnel Required	
					Techni- cal Manage- ment	General and Commer- cial Manage- ment
	Tons	Tons				
1. Aluminium ..	18,500	87,500	14,000	69,300	350	350
2. Copper	8,900	22,000	7,000	10,000	50	50
3. Lead	3,500	8,500	3,500	8,500	43	43
4. Zinc	Nil	15,000	Nil	15,000	75	75
					518	518

The returns furnished by the Indian Aluminium Company have been taken as the basis for the calculation of managerial norms which are 0.5% for technical management and 0.5% for general commercial management. The additional number of managerial personnel required for the non-ferrous industries during the third Plan is 518 for technical management and 518 for general commercial management. The development of the industry is in the following centres :

Aluminium

	Tons
Indian Aluminium Company's Plant, Hirakud	10,000
Indian Aluminium Company's Plant, Alwaye	5,000
Smelter at Rihand	20,000
Smelter at Koyna	20,000
Smelter at Salem	10,000
Aluminium Corporation of India	5,000

Copper

Khetri and Deribo Copper Mines	11,500
--------------------------------	--------

Zinc

Zawar Mines, Rajasthan	15,000
------------------------	--------

Miscellaneous Industries

The following table gives the production in 1960-61, estimated production in 1965-66, persons employed in 1960-61, additional persons required for the development and managerial norms for technical management and general commercial management and additional managerial personnel required for technical and general management :

No.	Name of Industry	Pro-duction	Estimated Production	Persons in Employment 1960-61	Additional Persons Req'd. for Development	Managerial Norms		Addl. Managerial Personnel Req'd.
		1960-61	1965-66			Technical Management	General & Commercial Management	
1	2	3	4	5	6	7	8	9
1.	Precision instruments (industrial and scientific) ..	3.6 crores	23 crores	3,000	23,000	1%	1.2%	230 276
2.	Surgical instruments ..	Nil	2.5 million pieces	Nil	2,700	1%	0.7%	27 19
3.	Automobile and ancillary industries.							
	Passenger cars, commercial vehicles, jeeps & station wagons	53,500	100,000	32,000	30,000	0.65%	0.45%	195 135
	Sewing machines	300,000	700,000	3,000	7,000	0.4%	1.1%	28 77
	Bicycles ..	1.05 million	2.2 million	5,000	5,000	0.4%	1.1%	20 55
	Ship building expansion of Hindustan Shipyard and Second Shipyard Dry Docks ..	20,000 G.R.T.	50,000 G.R.T.	5,000	7,500	1.5%	0.5%	112 38

*There are two figures in column No. 9. The first represents number of persons required for technical management and the second for general and commercial management.

Chemical Industries

The largest and most important development under this head during the third Plan will be in the field of fertilisers. The following is the capacity for nitrogenous fertilisers in the public sector :—

	(Tons of N)
Existing capacity (Sindri, Nangal, FACT)	217,000
Rourkela	120,000
Neyveli	70,000
Trombay	90,000
Nahorkatiya	32,500
Further expansion of FACT	40,000
Gorakhpur	80,000
One more fertiliser undertaking in the public sector	80,000
TOTAL	729,500

The following development in the private sector has already been approved :

	Tons
Sahu Chemicals	20,000
Ennore, Madras	8,250
Madhya Pradesh	50,000
Visakhapatnam	80,000
Kothagudiam	80,000
Rajasthan	80,000
West Bengal	58,000

The production capacity in 1960-61 was 110,000 tons of nitrogenous fertilisers. This is expected to increase to 1,000,000 tons at the end of the third Plan period. The number of persons in employment based on the analysis of the Sindri fertilisers was 16,000. The additional number of persons required for the development programme is 128,000. The managerial norms for this industry are 1% technical management and 0.5% general and commercial management. The additional number that will be required, therefore, is 128 for technical management and 64 for general and commercial management.

In the field of heavy chemicals, the most important for which development is planned are :

Sulphuric Acid
Caustic Soda and
Soda Ash

In 1960-61, the Sulphuric Acid plants in the country produced 363,000 tons. By the end of the third Plan, it is proposed to increase this capacity to 1,750,000 tons.

The following is the position regarding production in 1960-61 and targets for 1965-66 :

	1960-61	1965-66
Chemical Caustic	27,000	50,000
Electrolytic Caustic	97,435	350,000
TOTAL	1,24,435	400,000
Soda Ash (Light)	2,20,000	370,000
Soda Ash (Heavy)	Nil	160,000

The investment for heavy chemicals comprising Sulphuric Acid, Soda Ash, Caustic Soda, Calcium Carbide, Sodium Hydro-sulphite and Hydrogen Peroxide is of the order of Rs. 420 millions. The managerial norms for this industry are estimated to be 1% for technical management and 1% for general

and commercial management. The additional number of persons required are 120 for technical management and 120 for commercial and general management.

The following table gives the position regarding production of other chemical products and drugs and pharmaceuticals in 1960-61, estimated for 1965-66, capital investment proposed and additional number of managerial personnel required.

Name of Industry	Unit	1960-61 Production	Target (65-66)	Capital Investment (Rs. crores)	Additional Managerial Personnel Required	
					Tech. Manage- ment.	General and Commercial Manage- ment
1	2	3	4	5	6	7
Miscellaneous chemicals ..				13.0	40	40
(i) Carbon Black ..	000 tons	—	30			
(ii) Industrial explosives						
(a) Blasting explosives ..	"	6	20			
(b) Liquid oxygen explosives ..	"	2	9			
(c) Safety fuses ..	million coils	2	25.0			
(d) Detonators ..	million nos.	—	80			
(iii) Rubber chemicals ..	000 tons	n.a.	3			
Coke						
(a) Soft coke (low temperature carbonisation)	million tons	—	2.0	42.0	120	120
(b) Hard coke by-product	000 tons	500	1,160	29.2	80	80
(iv) Dyestuffs & organic intermediates						
(a) Dyestuffs ..	million lb.	11.5	22.4			
(b) Intermediates ..	tons	—	25,000			
(v) Drugs and Pharmaceuticals.						
(a) Sulpha drugs ..	tons	150	1,000			
(b) Penicillin ..	million mega units	40	205			
(c) Streptomycin ..	tons	—	150			
(d) P.A.S. ..	"	100	400			
(e) Anti-dysentery drugs ..	"	30	75			
(f) I.N.H. ..	"	30	100			
(g) Phytochemicals ..	"	—	76.4			
(h) D.D.T. ..	"	2,800	2,800			

Textile Industries

The requirement of cotton textiles at the end of the third Plan has been calculated on the assumption that 8,450 million yards of cloth will be needed for domestic consumption and 850 million yards for exports. The actual availability of cloth in 1960-61 was of the order of 6,750 million yards. Out of the target of 9,300 million yards proposed, 3,500 million yards have been allocated as a share of handlooms, khadi, small power looms etc. The production target allocated to the mill sector is 5,800 million yards as against the effective capacity of about 5,000 million yards at present. The number of persons in employment in 1960-61 in the cotton textile industry is 150,000.

The additional number for the development proposed is 24,000. In regard to the managerial norms, it may be pointed out that 5 textile mills have replied to the questionnaire and the figures of managerial personnel employed by them vary considerably. On this basis, the additional managerial personnel required will be of the order of 72 for technical management and 72 for general and commercial management. The actual production of rayon filament and staple fibre is about 95 million pounds. This is proposed to be increased to 215 million pounds by the end of the third Plan period. The additional number of persons that will be required is of the order of 36,000. On the basis of the managerial norms in the textile industry, the number of additional persons required is 108 for technical management and 108 for general and commercial management.

Food Industries

Salt

Production in 1960-61 for salt was of the order of 3.7 million tons. This is expected to be increased to 6.5 million tons by the end of the Plan period. The additional number of persons required is 1,000. The managerial norms for this industry are .4% technical management and .2% general and commercial management. The total number of managerial personnel required is 4 for technical management and 2 for general and commercial management.

Vanaspati

Estimated production of Vanaspati in 1960-61 was 330,000 tons. The development proposed is to increase this to 550,000 tons by the end of the current Plan period. The number of persons in employment in 1960-61 was 7,000. The additional number required for the development proposed is 5,000. Managerial norms are 1% for technical management and 1% for general and commercial management. Additional number of managerial personnel required for technical management is 50 and for general and commercial management 50.

Other Industries

The following table gives the production in 1960-61, target for 1965-66, number of persons employed in 1960-61, additional number required for development, managerial norms and additional number of managerial personnel required during the third Plan :

Name of Industry	Production	Estimated Production	Persons in Employment	Additional Persons Req'd. for Development	Managerial Norms		Additional Managerial Personnel Required	
					Tech. Management	General & Commercial Management	Tech.	General & Commercial
1	2	3	4	5	6	7	8	9
Paper and Paper Board	375,000	970,000	18,750	29,750	1%	1.5%	300	450
Cement	8.5 million tons	15 million tons	28,000	23,400	0.22%	0.33%	52	78
Glass and Glassware	84,000 tons	—	11,000	28,600	0.9%	1.00%	257	286
Soap	150,000 tons	500,000 tons	—	6,000	0.5%	1%	30	60

1	2	3	4	5	6	7	8	9
Synthetic Rubber	—	50,000 tons	—	12,000	1.26%	1.84%	151	220
Plastics	10,000 tons	85,000 tons	Not available	14,000	1%	0.5%	140	170
Refractories	0.52 million tons	2 million tons	"	13,000	1%	1%	130	260
Power & Industrial Alcohol	22 million gallons.	72 million tons	1,100	5,000	1%	1%	50	50
Industrial Gases	790 million cu. ft.	2,550 million cu. ft.	6,400	14,000	0.9%	2.8%	125	392
Petroleum Products, Crude oil	5.67 million tons	10.77 million tons	Not available	16,000	1%	2%	160	320

The requirements of managerial personnel for production management and general commercial management for the third Five-Year Plan period is given below. The basic assumption made in the calculation of personnel is that the targets of production as envisaged in the third Plan would be achieved and that the allocation of industries in the private and public sectors would be in accordance with the Industrial Policy Resolution of the Government of India. To quote an example, private industries are not keen to take up the manufacture of fertilisers and this has resulted in the enlargement of the public sector and consequent reduction in the private sector. Such mid-Plan changes obviously could not be taken into consideration in the preparation of these estimates. Another assumption is that industrial efficiency would remain the same throughout the five-year period. At best, these estimates are an indication of the order of requirements for the development envisaged in the third Plan.

Industry	Production Management	General & Commercial Management
1. Industrial Machinery & Equipment Manufacturing Industries	2,000	2,000
2. Iron & Steel	631	428
3. Non-ferrous Metals	518	518
4. Miscellaneous Engineering Industries :		
Precision Instruments, Automobiles, Ship-building, etc.	612	600
5. Chemical Industries :		
Fertilizers	128	64
Heavy Chemicals	120	120
Miscellaneous Chemical Industries such as Drugs, Pharmaceuticals, Dyestuffs, Liquid Oxygen, etc.	280	280
6. Textiles :		
Cotton Yarn and Cloth	72	72
Rayon	108	108
7. Vanaspati	50	50
8. Miscellaneous Industries such as Paper, Cement, Soap, Plastics, etc.	1,396	2,286
	5,915 or 5,900	6,506 6,500

CHAPTER III

MANAGERIAL PERSONNEL REQUIREMENT FOR SECTORS OTHER THAN INDUSTRY

The Committee, at its meeting held on the 10th June, 1962, decided that it was necessary to have a separate questionnaire for commercial establishments. The questionnaire was drawn up in consultation with Dr. V. K. H. V. Rao and Shri R. Prasad. A copy of the questionnaire may be seen at Appendix-IV. The questionnaire sought information regarding number of persons employed in managerial capacity in purchase and sales management, organisational and personnel management, and the total gross value of purchase and sales. Though this questionnaire was issued to about 100 business houses, only a few replied. The replies are analysed below :

Burmah Shell

Total Gross value of annual business	Rs. 1,840 millions
No. of personnel employed in managerial capacities	417
Approximate average per managerial personnel	Rs. 4.4 millions

Acharya Bros.

Total gross value of annual business	Rs. 15 millions
No. of personnel employed in managerial capacities	7
Approximate average per managerial personnel	Rs. 2 millions

Sen & Pandit (Pvt.) Ltd.

Total gross value of annual business	Rs. 41.4 millions
No. of personnel employed in managerial capacities	9
Approximate average per managerial personnel	Rs. 4.4 millions

State Trading Corporation of India

Total gross value of annual business	Rs. 650 millions
No. of personnel employed in managerial capacities	140
Approximate average per managerial personnel	Rs. 4.6 millions

On an average, therefore, Rs. 4.5 millions is fixed as the norm for calculation of managerial personnel required by trade and commerce in the export and import business.

The total import at the commencement of the third Plan was of the order of Rs. 10,720 millions and the total likely imports at the end of the third Plan inclusive of P L. 480 imports is estimated to be of the order of Rs. 12,700 millions. The increase in imports over the plan period is, therefore of the order of Rs. 2,000 millions. The annual exports at the commencement of third Plan is of the order of Rs. 6,140 millions. It is expected that by end of third Plan period this would be doubled. The total increase in the value of import and export business is of the order of Rs. 8,140 millions and applying the norm of Rs. 4.5 millions to each managerial personnel the number of additional personnel required is of the order of 1700.

Banking

Of the banks addressed, four replied to the questionnaire. They are :

1. Reserve Bank of India
2. State Bank of India
3. Punjab National Bank
4. Bank of India

The Reserve Bank of India have informed that they have their own arrangements for the training of their personnel and would not ordinarily depute persons for management studies. The Bank has a sandwich system of instruction under which training in the various departments of a bank is imparted together with theoretical instruction in such subjects as are necessary for banking personnel. The course of instruction covers certain management subjects. The reply of the State Bank is also in the same vein. The Bank of India has also informed that they utilise the training facilities organised for the Reserve Bank and hence do not propose to depute any persons for management training. The Punjab National Bank has 10,540 persons in employment out of which 1,800 persons come under the category of general management.

There are at present 83 scheduled banks in the country. The total number of offices of scheduled banks at the commencement of the third Plan was 4,401. By the end of the third Plan, it is expected that there would be a 20% increase in the number of branches of the banks. The number of persons in employment at the commencement of the Plan was of the order of 60,000. At the end of the Plan, therefore, an additional number of 12,000 persons is likely to be employed. The figures furnished by the Punjab National Bank show that about 17% of the persons employed in the Bank have managerial responsibilities and supervisory functions. On this basis, the number of additional personnel required for banking in the third Plan is 2,040. Since, however the Reserve Bank of India and the State Bank of India and others have their own arrangements for training which, *inter alia*, includes management subjects, the requirement of managerial personnel for banking establishment may be estimated at 1/4th of the number i.e., say 500.

Insurance

The Chairman of the Life Insurance Corporation has informed that though he agrees in principle that training in management subjects would benefit the employees of the Life Insurance Corporation, yet as the present staff has to be trained in the Life Insurance itself, it becomes a question of priority and naturally priority has to be given to training of personnel in the techniques of Life Insurance Business itself. In the circumstances, it has not been envisaged that the Life Insurance Corporation would be taking advantage of the training facilities for the management studies in the present juncture. In the overall calculation for managerial personnel, requirements of insurance industry need not be taken into consideration.

The Committee is, however, of the view that executives employed in Life Insurance business should have managerial training and it would be to their advantage if the junior and senior executives could be deputed to educational institutions imparting instruction in Management.

Small-Scale Industries

In the estimates of personnel made in the report of the third Plan, the additional employment under small-scale industries is shown as 9 lakhs. The National Productivity Council and the Small-Scale Industries Institutes have organised short-term courses of three-month duration for small-scale industries and such other persons desirous of equipping themselves with managerial know-how and techniques are likely to prefer this course as it aims at imparting instructions in the modern industrial techniques in addition to management principles and practices. It is, therefore, doubtful whether many persons starting small-scale industries would take advantage of the training scheme for

managerial personnel. In the circumstances, the requirements of the small-scale industries need not be taken into consideration in the overall estimates of the managerial personnel, though it is likely that a few persons desirous of having better knowledge in Management theory and practice may join this course.

Construction and Transportation

The managerial norms for Construction and Transportation have been worked out on the basis of published statistics in the following reports.†

Report on Occupational Pattern of Employees in the Public Sector in India, and

Report on Occupational Pattern of Employees in the Private Sector in India (1961).

At the beginning of the third Plan, the number of workers in Construction industry in the private and public sectors was 118,500 and 531,193 respectively, totalling 649,693, or say 0·65 millions. Managerial personnel for construction industry fall into two categories, viz., (i) technical personnel, civil engineers and overseers, and (ii) business and commercial management personnel. The number of civil engineering personnel in construction industry was 3,115. The employment pattern in this industry is one civil engineering degree holder for every four overseers and hence 620 civil engineers with degree qualification may be presumed to be in position. This works out to 0·33% and this may be taken as the managerial norm for technical personnel employed in construction industry. The number of non-technical managerial personnel is 5,400 for the total labour force of 0·65 millions. This works out to 0·38% and this may be taken as the norm for General and Commercial Management.

In 1960-61, the National Income under the head Construction was Rs. 3,310 millions.* At the end of the third Plan this is expected to increase to Rs. 5,400 millions, i.e. an increase of 63%. Providing for increased efficiency of construction due to mechanical devices and higher labour output and such other factors, a reduction of 2½% per annum, i.e. an overall adjustment of 12½%, may have to be provided to arrive at man-power requirements. Making this adjustment, the additional working force required to achieve the national targets of the third Plan is 50%, i. e. 0·325 millions. Applying the managerial norms, the number of managerial personnel required for technical management is 1,072 or 1,070. For General and Commercial Management, it is 2,700.

Transportation

In this category are :

- (i) Railways,
- (ii) Shipping,
- (iii) Airways, and
- (iv) Road Transport.

†Published by the Director General of Employment and Training, Ministry of Labour.

*Planning Commission Report.

The Railways

The Railways have been traditionally a storehouse of technical and management man-power which have been unstintedly spared by the organisation for the development of public sector industry. The recent success of the Integral Coach Factory, Madras and the Chittaranjan Locomotive Factory, West Bengal are in no small measure due to their awareness of the latest techniques of production, the need for work study and other management practices leading to increased efficiency. In the circumstances, for the purposes of the estimates of managerial personnel, it may be presumed, the requirements of Railways would be in the main taken care of by the organisation itself.

Shipping

At the beginning of the third Plan, the capacity of Indian shipping was 0.9 million G. R. T. It is expected to increase to 1.7 million G.R.T by the end of the third Plan. The share of the overseas shipping is expected to move up from 0.6 million G. R. T. in 1960-61 to 1.3 million G.R. T. in 1965-66. The managerial personnel required are for employment in the head office, representation in foreign countries and also in Indian ports. Additional managerial personnel has been estimated as 2 persons for every 10,000 tons and hence the total requirement of managerial personnel in the category of General and Commercial Management is 160.

Airways

The third Plan provides for an expenditure of 255 millions on Civil Aviation which is distributed between the various categories as shown below :

(i) Works at aerodromes	.. .. .	185 millions.
(ii) Aeronautical telecommunication equipment	.. .. .	50 ..
(iii) Air routes and aerodromes	.. .. .	10 ..
(iv) Training and education equipment	.. .. .	8.4 ..
(v) Research & development equipment	.. .. .	1.6 ..
TOTAL	.. .. .	255 millions.

A sum of Rs. 295 millions for the expansion of the air corporations has also been included in the third Plan. The Air India International had, at the commencement of the third Plan, three Boeings and nine Super-Constellations. The programme for the third Plan provides for the purchase of four additional jet aircrafts. The operating fleet of the Indian Airlines Corporation, at the commencement of the third Plan, consisted of 54 Dakotas, 5 Skymasters and 10 Viscounts. The Programme in the third Five-Year Plan provides for the purchase of four Viscounts and 25 modern air-crafts to replace Dakotas. A provision of Rs. 150 millions has been made in the third Plan for the Corporation.

The managerial personnel required for the Airways fall into two categories:

- (i) Maintenance Engineers required at the aerodromes; and
- (ii) General and commercial management personnel required at the head offices and branch offices in India and abroad.

Engineers and other personnel are eligible to work as ground-engineers at the aerodromes and in workshops after obtaining a certificate issued by the Department of Civil Aviation. As these executives deal with the labour, it would be an advantage if some managerial training is given to them. Currently, this is not the practice. The functional courses organised by the National

Institute for Training in Industrial Engineering Bombay, National Productivity Council, would be able to cover the requirements in this respect. The Corporation requires general and commercial management personnel. On an average, one managerial personnel is required for Rs. 4 millions of capital investment and on this basis, the number of persons required would be about 60.

Road Transport

The number of personnel employed at the commencement of third Plan is 90,000 and that of the managerial personnel is 2,900. The managerial norm is, therefore, 3.2%. The position at the commencement of the third Plan regarding commercial vehicles is as follows :—

Goods Trucks	..	..	..	..	170,000
Passenger Buses	..	..	..	..	58,000
TOTAL	..	..	..	..	228,000

This is expected to increase by 132,000 by the end of the third Plan period : the increase in goods trucks is 110,000 and in passenger buses 22,000. The increase in vehicles, therefore, is of the order of 58%. Providing for increased efficiency and optimisation of the facilities, the increase in personnel may be fixed at 50%. Applying the managerial norm of 3.2%, the additional General and Commercial Management Personnel required is 1,450.

Summary total for Transportation—

Road Transport	..	..	..	..	..	1,450
Shipping	..	..	..	..	..	180
Air Transport	..	..	..	..	..	60
TOTAL	..	..	..	..	..	1,690

The following is the summary of the requirements of managerial personnel in the various non-manufacturing sectors :

The figures represent the requirements if the targets of export and import trade, shipping, road transport and construction as envisaged in the third Plan, are reached. There have been mid-term variations. The shipping target is expected to be exceeded whereas the target for export is not likely to be achieved. The figures given indicate the order of requirement rather than the exact requirements.

						Technical Management	General and Commercial Management
Trade & Commerce	..	..	..	..	..	—	1,700
Banking	..	..	..	..	..	—	500
Construction	..	..	..	..	..	1,070	2,700
Transportation	..	..	..	..	..	—	1,690
TOTAL	..	..	..	..	..	1,070	6,590

CHAPTER IV

MANAGEMENT CADRES AND PRESENT TRAINING FACILITIES

The estimates for technical personnel made in the previous two chapters are for managerial personnel with degrees in engineering or technology. The lower categories consisting of personnel with diploma qualifications and sometimes with no academic qualifications at all but having only experience are also in supervisory positions exercising managerial functions. The organisational chart of two selected industrial establishments may be seen in Appendix V. It will be observed that cadres such as Foreman, Assistant Foreman, Senior Chargeman, Senior Draftsman, Overseer, Technical Assistant etc. exercise supervisory functions and in general a university degree in engineering is not considered essential for carrying out the duties assigned to these posts. Ordinarily, an Assistant Engineer or a person working in an equivalent rank is the lowest in the technical cadre for whom a degree qualification is almost obligatory. For every Assistant Engineer down the scale there are about 3 to 4 technical personnel exercising supervisory functions depending upon the nature of industry.

The Board of Technical Studies in Management have formulated four courses of study for the various cadres of management personnel. They are :

- (1) Industrial Engineering;
- (2) Foreman Supervision;
- (3) Industrial Management; and
- (4) Business Management.

Industrial Engineering is a post-graduate diploma course of one year's duration on full-time basis or three years on part-time basis, open to graduates in engineering. The course imparts instruction in managerial practice and principles and modern techniques of Production, Planning and Control. The following are the subjects taught in the post-graduate course :

Part I

1. Structure & Economic Aspects of Industry & Commerce
2. Personnel Management and Industrial Relations
3. Management Principles and Practice
4. Procurement & Inventory Control

Part II

1. Work Study
2. Materials Handling
3. Statistical Methods and Statistical Quality Control
4. Location of Industry and Plan Layout
5. Product Design and Development

Part III

1. Production, Planning & Control
2. Cost Control
3. Quality Control & Metrology
4. Operational Research
5. Maintenance
6. Job Evaluation & Merit Rating
7. Project Work & Report (Instruction & Contact hours)

The syllabus of studies as approved by the Board of Technical Studies in Management may be seen in Appendix VI. The course is offered on a full-time basis in the Indian Institute of Technology, Kharagpur, and on part-time basis in the Victoria Jubilee Technical Institute, Bombay.

Foremanship and Supervision course is a certificate course open to matriculates having three years experience in a supervisory position in industry. Instruction is imparted in the following nine subjects:

- Elements of Supervision
- Industrial History and Industrial Relations
- Communications in Industry
- Elementary Principles of Management
- Elements of Personnel Management
- Principles of Foremanship
- Principles of Production Planning
- Principles of Remuneration, Estimating and Costing
- Safety in Industry

Syllabus approved for the course by the All India Board of Technical Studies in Management may be seen in Appendix VII. The course can be organised in an industrial establishment or in a technical institution. There are three courses at present in the country and all the three are on a part-time basis. One of them is at Jamshedpur and is organised by the Tata Iron and Steel Company Ltd., Jamshedpur. The Gujarat Textiles Association has organised a course in Baroda in collaboration with the Baroda University. The Victoria Jubilee Technical Institute, Bombay, has organised a course in the Institution. There is a proposal for the consideration of the Board for setting up an institute which will impart instruction on a full-time basis in Foremanship and Supervision.

With the assistance from the United Nations Special Fund, Government have set up a National Institute for Training in Industrial Engineering. The Institute will conduct functional courses ranging from one week to 22 weeks in the following subjects:

- Advanced Work Measurement—Comprehensive Course
- Work Measurement—Comprehensive Course
- Production Planning & Control—Comprehensive Course
- Sales Organisation—Comprehensive Course

Method Study—Comprehensive Course
 Operative Training Methods—Comprehensive Course
 Profit Planning & Financial Control
 Standardisation, Simplification & Variety Reduction.
 Plant Maintenance
 Business Appraisal
 Estimating & Pricing
 Design and Implementation of Incentive Schemes
 Job Evaluation & Merit Rating
 Clerical Organisation
 Stock Control, Tool Room Control and Storekeeping.
 Purchasing Methods & Value Analysis
 Selection Methods & Procedures
 Product Engineering
 Plant Design & Layout
 Materials Handling
 Management Controls
 Profit Sharing Methods

Industry Courses:

Cotton Textiles
 State Transport
 Building Industry
 Jute Industry
 Woodworking Industry
 Light Electrical Engineering
 Foundry Industries
 Sugar Industry
 Radio Industry



The course of study in Business and Industrial Management drawn up by the All India Board of Technical Studies in Management is open to those who are graduates and who have at least two years experience in a responsible supervisory capacity. The course extends over a period of one year on a full-time basis and three years on a part-time basis. There is also provision in the scheme for the slab system of instruction under which candidates are given three months full-time instruction in a year, the entire course being completed in three years. The subjects of study comprise : (a) Background Subjects; (b) Tools of Management; (c) Management Subjects; and (d) Specialised Operational Subjects.

The Background subjects are:

1. The Growth and Structure of Industry & Commerce
2. The Economic aspects of Industry & Commerce
3. The Legal Aspects of Industry & Commerce
4. Psychology

The Tools subjects are:

1. Accounting
2. Statistical Method
3. Work Study & Organisation and Job Evaluation
4. Budgetary & Higher Control

The Management subjects are:

1. The History and Nature of Management
2. Management Principles
3. Management Practice
4. The Personnel Function

The Operational subjects are:

1. Manufacturing
2. Development & Design
3. Distribution
4. Purchasing, Storekeeping and Transportation

All the 12 subjects comprising the first three groups cover a body of knowledge essential to all those who aspire to higher levels of management whether in operational or functional division of an enterprise or in general management.

The post-graduate course in Business Management and Industrial Management are at present being offered in the following centres:

1. Delhi University
2. Indian Institute of Social Welfare and Business Management, Calcutta
3. Madras University
4. Bombay University
5. Osmania University (Business Management only)
6. Thiagarajar Educational Trust, Madurai (Business Management only)

The Board has also approved the starting of two courses at the P.S.G. Engineering College, Coimbatore, Allahabad University and Kerala University. The approved intake for each of the courses is 30.

With the assistance of the Ford Foundation, Government have set up two Institutions, one at Calcutta and the other at Ahmedabad named the Indian Institutes of Management, Calcutta and Ahmedabad which will *inter-alia* conduct full-time courses of two years' duration at the Master's degree level in Management. The courses of study are at present designated as post-graduate diploma course in Business Administration. By the end of the third Plan, it is expected that these two institutions will have an intake of 150 each in the post-graduate diploma course. Admission to this course is open to brilliant young graduates with proved aptitudes in Management.

Administrative Staff College, Hyderabad

The College was established in 1957 on the model of the Administrative Staff College Hanley-on-Thames, England. Its object is to bring together under one roof Senior Executives of proved ability from different fields of activity to study the skills and techniques of higher management and leadership. By living and working together the participants are enabled:

- (1) To interchange and analyse ideas and experience.
- (2) To acquire a close acquaintance with the economic, social and political environment in which they operate.
- (3) To get a deeper understanding of the inter-relationship between different sectors of the national economy and between Public Administration and Business Management; and to appreciate how their respective roles complement each other in the achievement of the common national objectives.
- (4) To enrich their personalities and increase their competence as administrators by developing greater insight into and a broader approach to executive problems.

The College admits 50—60 candidates to each session of 12 weeks.

The National Productivity Council of India and the All India Management Association have also a part to play in the promotion and development of management education. The former has annual programmes for short functional courses ranging from one week to 26 weeks dealing with different aspects of management techniques and practices relating to production. The latter has been arranging seminars on diverse management topics which attract top and middle management personnel from all parts of India. In addition, every year there is an annual intensive programme of study of a selected topic in management which is attended by top management personnel in industry, educational institutions and Government.

Organised In-service Training

The direct method of training management personnel is through planned and organised in-service training programmes. Such programmes may include theoretical instruction besides supervised on-the-job training. Several establishments in the private sector, notably Tatas, Hindustan Lever, Standard Vacuum etc. have well-developed in-service training programmes. The Tatas have set up a staff training college at Jamshedpur for continuing attention to the in-service training and development of their supervisory and management staff at junior levels. They also maintain a college at Poona for the training of their middle and higher level management personnel. In the public sector, Hindustan Steel have set up a small management training centre at Ranchi. Generally speaking, however, adequate attention is not paid at present to the training and development of managerial personnel in many enterprises including public sector enterprises. There appears to be need for creating greater awareness among top management personnel of the importance of organised in-service training programmes for the development of managerial skills and talents.

CHAPTER V

REQUIREMENTS OF MANAGERIAL PERSONNEL FOR THE THIRD AND FOURTH PLANS AND PROVISION OF INCREASED FACILITIES FOR TRAINING IN MANAGEMENT

The Committee was entrusted initially with the assessment of managerial personnel for the third Plan period. The third Plan period is about to be over and planning for the fourth Plan is under way. Hence the Committee has made tentative estimates for the fourth Plan. It would be possible to work out correct estimates only after the Plan targets for industry have been fixed and the financial ceilings decided. However, for purposes of preliminary estimates the figures used by the Planning Commission in their Rs. 220,000 million Plan for the fourth Plan period can well be a guide. The following is a structure of manufacturing industries in India from 1960-61 to 1975-76 as anticipated by the Planners:

Sl. No.	Items	Net Value of Production (Rs. million)			
		1960-61	1965-66	1970-71	1975-76
1.	Consumer goods industries ..	4,236	5,468	8,146	11,920
2.	Intermediate goods industries ..	3,491	8,518	18,926	32,097
3.	Machinery	1,513	4,227	9,899	15,422
4.	Others	68	128	254	403
	Large factories—Sub-total ..	9,308	18,341	37,225	59,842
5.	Small factories	1,288	2,646	5,558	8,704
6.	House hold industries	8,190	9,990	15,210	22,340
	Total small enterprises (5) + (6)	9,478	12,636	20,768	31,044
7.	Adjustment for coverage ..	2,604	2,604	2,604	2,604
	Grand Total	21,390	33,580	60,600	93,490

It will be observed that the net value of production at the end of the year 1965-66 stands at Rs. 33,580 millions. It is estimated to increase to Rs. 60,000 millions at the end of the fourth Plan period. This represents about 80% increase in production on the prices obtaining in 1960-61. The number of management personnel required, therefore, is also 80% more for industrial production than that estimated for the third Plan period. The following is the estimate of the number of managerial personnel required under technical management and general and commercial management for the third and fourth Plan schemes:

THIRD PLAN

	Technical Management	General & Commercial Management
Trade & Commerce	—	1,700
Banking	—	500
Construction	1,070	2,700
Transportation	—	1,690
Manufacturing Industries	5,915	6,506
	6,985	13,096

FOURTH PLAN

	Technical Management	General & Commercial Management
Manufacturing Industries	10,267	11,711
Banking	—	900
Trade & Commerce	—	3,060
Construction	1,926	4,860
Transport and Communications	—	3,042
	12,573	23,573

There are a number of factors which have to be taken into consideration in regard to the above estimates. As pointed out earlier, the estimated requirements are based on the assumption that division of industry between private sector and public sector would be as in the third Plan. If there is further rationalisation, the requirements of the managerial personnel would be higher. Further these estimates are based on the norms as worked out for the third Plan. There would be material variation in certain industries due to introduction of modern methods of production, increased efficiency and rationalisation. The assessment figures have therefore this limitation.

From the analysis of the replies received to the questionnaire, it is observed, of the 1,700 technical personnel employed in manufacturing industries, about 500 require training. This works out to about 30 per cent for technical managerial personnel and about the same percentage would be applicable to the other category of the general and commercial personnel.

The number of people to be trained in the category of Technical Management is therefore of the order of 4,000 and under General and Commercial Management about 7,200.

For the training of 4,000 industrial engineers during the five-year period, as the course is of 12-month duration the number to be trained per annum is 800. The intake to this course on a full-time basis is 20 and hence the number that will be possible to train per annum would be considerably less. The target of training of industrial engineers for the fourth Plan should be the training of 300 industrial engineers per annum. The following are likely places, among others, where such training could be organised:

- (1) Indian Institute of Technology, Bombay.
- (2) Indian Institute of Technology, Madras.
- (3) Indian Institute of Technology, Kanpur.
- (4) Indian Institute of Technology, New Delhi.
- (5) Indian Institute of Science, Bangalore.
- (6) Jadavpur University, Calcutta.
- (7) Bengal Engineering College, Howrah.
- (8) P. S. G. College of Engineering & Technology, Coimbatore.
- (9) Victoria Jubilee Technical Institute, Bombay.
- (10) Maulana Azad College of Engineering & Technology, Bhopal.
- (11) Regional Engineering College, Durgapur.

- (12) Regional Engineering College, Rourkela.
- (13) Regional Engineering College, Jamshedpur.
- (14) Faculty of Technology, Baroda University, Baroda.
- (15) Bihar Institute of Technology, Sindri.

In regard to the lower cadres of supervisory personnel a concerted effort should be made to persuade as many industrial establishments as possible to undertake the organisation of this training. The All India Board of Technical Studies in Management has estimated the requirements of the course at Rs. 8,000 per course and this has been reported to be very inadequate and therefore an assessment of the requirements for the organisation of this training will have to be made afresh and future grants sanctioned on this basis. The principle to be observed is that an industrial establishment volunteering to start this course should not be handicapped with any financial liability on this account. The Tata Iron & Steel Co. has sponsored the proposal to start a full-time institution for imparting full-time instruction in Foremanship and Supervision. This is a move in the right direction. The Committee is of the view that the Institute should be started as early as possible and that at least three institutions of this type should be established during the fourth Plan period. The other two suitable centres are Bangalore and Bombay. The possibility of National Institute for Training in Industrial Engineering organising this course should be considered in the first instance. If for some reason, the National Institute for Training in Industrial Engineering is not able to organize this course then only should another centre in Bombay be considered.

The questionnaire for managerial personnel had also sought information on the additional centres to be started for the organization of part-time courses in Industrial and Business Management. The Centres suggested are:—

- (1) Baroda
- (2) Coimbatore
- (3) Madurai
- (4) Bangalore
- (5) Durgapur
- (6) Kanpur
- (7) Ranchi
- (8) Jamshedpur
- (9) Ahmedabad
- (10) Bhilai
- (11) Hyderabad

Of these, the Board has already approved the starting of management courses in Madurai, Hyderabad and Coimbatore.

In Appendix III may be seen the locationwise distribution of industries pertaining to electrical and mechanical machinery equipment and managerial personnel required for their contemplated development. In Appendix V should be seen the location of the major industries—Ferrous, Non-ferrous and Chemical Industries. It will be observed that apart from Bombay, Calcutta, Jamshedpur, Madras, Coimbatore and Durgapur, at least as far as the third Plan is concerned, there is no other suitable centre for the organisation of

part-time courses in Industrial Management. The Committee would, therefore, suggest that requests for starting of part-time courses in Industrial Management should be limited to such centres where industrial development envisaged employment of large numbers of managerial personnel.

One of the bottlenecks in the organisation of part-time courses in Business Management and Industrial Management is the lack of properly qualified teachers to teach management subjects and industrial psychology. The Committee is of the view that this matter requires attention of the Board and would suggest for consideration that some collaborative arrangement may be worked out with the Indian Institutes of Management at Ahmedabad and Calcutta and with the National Institute for Training in Industrial Engineering under which training in Management Principles and Practices and Industrial Psychology could be imparted by the personnel of these three institutions to those undergoing instruction in University institutions. There are two ways by which this could be achieved. The first and the most obvious is for the three institutes named above to depute the trained teachers for short periods for a month or so to university institutions. The other possibility is for the university institutions to send their students to the management institutions for short periods for receiving instruction in special management subjects. Further, the two Institutes of Management should organise regular courses for the training of teachers of management subjects in University institutions.

The Board has approved introduction of what is known as the slab system under which full-time instruction is imparted for three months in a year and the whole training is phased in three years. This system has not been introduced by the University institutions at present conducting part-time courses. Adoption of this method would extend the catchment area of the trainees for the University institutions and would benefit industrial and commercial establishments which are not in the immediate vicinity of the University institutions.

As already stated earlier, in the field of General and Commercial Management, facilities for full-time courses exist in the two Management Institutions set up at Ahmedabad and Calcutta. These two institutions have programmed for an admission capacity of 150 for their post-graduate Diploma Course in Business Administration. It is expected that this target will be reached by the end of the current Plan period. It was reported to the Committee that Government have under consideration, the question of increasing intake to these institutions to 300 during the fourth Plan period. This is a move in the right direction and is supported by the Committee. The Committee recommends that two more institutions on the pattern of the existing institutions at Ahmedabad and Calcutta should be set up during the fourth Plan period.

The Committee further recommends that intake to the institutions conducting part-time courses at present should be increased for Business Management and that new centres for business management be started wherever possible after ensuring that suitable teachers would be available. The Committee expresses its grateful thanks to the industrialists and organisations and people who extended their cooperation to the Committee and furnished necessary information.

APPENDIX I

Copy of the D.O. letter No. F. 10-15/60-T.2 dated 30-10-61 from Dr. A. Ramaswami Mudaliar, Chairman, Committee for Assessment of Management Personnel, addressed to various Industrial Firms

The All India Board of Technical Studies in Management has set up a Committee under my Chairmanship to assess the requirements of management personnel for the country's development programme in the private and public sectors. The need for post-graduate professional education in management subjects was recognised by the Board sometime ago and it has organised two courses viz. (i) course of study in Business Management and (ii) course of study in Industrial Management, in a few selected institutions. These courses are open to persons working in commercial houses or industrial establishments who are graduates and who have a minimum of two years requisite experience. Under the scheme prepared by the Board, there is a common Intermediate examination in the following subjects :

1. Growth & Structures of Industry & Commerce
2. Economic Aspects of Industry & Commerce
3. Legal Aspects of Industry & Commerce
4. Psychology
5. Financial Accounting & Evaluation
6. Statistical Method
7. Work Study, Organisation & Evaluation
8. History & Nature of Management

The subjects for the final examination in Business Management are as under :

1. Management Principles
2. Management Practice
3. The Personnel Function
4. Financial & Higher Control
5. Purchasing, Storekeeping & Transportation
6. Sales Organization & Methods
7. Market Research & Sales Promotion
8. International Trade

The subjects for the final examination in Industrial Management are as under :

1. Management Principles
2. Management Practice
3. The Personnel Function
4. Development & Design
5. Factory Organisation
6. Production Planning & Control
7. Plant layout & Materials Handling
8. Work Study

2. These courses are at present organised on a part-time basis. Facilities for instruction in these courses are available at the following centres :

1. Delhi University
2. Bombay University
3. Madras University
4. All India Institute of Social Welfare & Business Management, Calcutta

The All India Council for Technical Education, under the recommendation of the Board has also approved the organisation of these courses in the following centres :

1. Gujarat University
2. Madurai
3. Lucknow University
4. Allahabad University

Government of India are also setting up two institutions of Management—one at Calcutta and the other at Ahmedabad, which will provide courses leading to the award of degrees in management subjects.

3. The purpose of the inquiry is to assess the requirements of managerial personnel who may be trained in the theory and practice of management with a view to determine the extent of facilities that should be organised in the country for the training of such personnel. To enable this to be done, it is necessary to have information about the existing managerial personnel in the following fields of management:

1. Technical Management
2. General Management
3. Commercial Management

4. The large majority of the personnel at present in position in your establishment would have had no institutional training in Management subjects but would have acquired the necessary managerial skill from experience. If you hold the view that an institutional post-graduate training in Business Management or Industrial Management would enable the junior members of your present managerial cadre to carry out their duties more efficiently, I shall be glad to have your estimate of the number of such managerial personnel in regard to two or three selected representative concerns under your control. Similar information is also required in respect of staff who may retire shortly and who will have to be replaced and also staff required for the expansion programme, if any, that your establishment may have in view. The requirements assessed by you under these categories should be for the third Plan period and as such an estimate would greatly assist the Committee to determine the overall requirements of the country.

5. In paragraph 2 above, I have indicated the existing centres where training facilities in Management subjects are available or are proposed to be made available. Your suggestion as to the additional centres which in your opinion should be organised will also be helpful. To determine the overall norms for the calculation of the managerial personnel it would assist the Committee if you can indicate the number of employees of all categories in your establishment. I shall also be grateful if you would advise me in regard to the method that you have adopted for making an estimate of the additional managerial personnel needed by your organisation.

6. I enclose a questionnaire calling for the above information which may kindly be completed at your earliest convenience and forwarded to Shri M. V. D. Nair, Secretary, All India Board of Technical Studies in Management, Ministry of Scientific Research & Cultural Affairs (now Ministry of Education), New Delhi.

Questionnaire on Managerial Personnel

1. Name of the establishment
2. Nature of business/industry
3. Total number of persons in employment
4. Number of personnel of managerial level at present employed in:
 - (a) Technical Management viz.,
 - (i) Production Management
 - (ii) Development Management
 - (iii) Transport Management
 - (b) Commercial Management, viz.,
 - (i) Distribution Management
 - (ii) Purchasing Management
 - (iii) Financial Management
 - (c) General Management, viz.,
 - (i) Personnel Management
 - (ii) Office Management
 - (iii) General Management
 - (d) Combination of all or more than one of the above categories

5. Number of persons at present in service for whom training facilities in management subjects may be required
 - (a) Industrial Management
 - (b) Business Management
6. Number of trained managerial personnel required during the third Plan period under the following categories to provide for (a) normal retirement requirements (b) to provide for expansion of the existing establishment
 - (1) Industrial Management
 - (2) Business Management
7. Location of the additional centres which in your view should provide training facilities in Industrial Management & Business Management
8. Your suggestions as for the method to be adopted to assess the requirements of managerial personnel

List of Firms

1. Shri Satya Paul,
M/s Aminchand Payarelal,
Tanda Road,
Jullundur City.
2. Shri S. S. Kanoria,
9, Brabourne Road,
Calcutta-1.
3. Shri P. N. Talukdar,
N. R. Sarkar & Co. (P) Ltd.,
4, Chittaranjan Avenue,
Calcutta-13.
4. Shri B. P. Poddar,
36, Chowringhee Road,
Calcutta-16.
5. Shri Shantilal M. Shah,
43, Tamarind Lane,
Fort, Bombay-1.
6. Shri Navnit Sodhan,
Sarangapur Cotton Mfg. Co. Ltd.,
Outside Raipur Gate,
Post Box No. 19,
Ahmedabad.
7. Shri T. S. Rajam,
404, 11th Cross Road,
Malleswaram,
Bangalore-3.
8. Shri Pravinchandra V. Gandhi,
Devkaran Nanjee Banking Co. Ltd.,
Devkaran Nanjee Building,
17, Horniman Circle, Fort,
Bombay-1.
9. Shri Nand Lal Kanoria,
General Fibre Dealers Ltd.,
India Exchange,
Calcutta-1.
10. Shri B. L. Jalan,
8, Dalhousie Square East,
Calcutta-1.
11. Shri Naval H. Tata,
'Bombay House',
Bruce Street,
Bombay-1.

12. Shri S. L. Kirloskar,
Bungalow No. 1, Modi Baug,
Ganeshkhind Road,
Poona-5.
13. Shri C. H. Bhaba,
Construction House,
Ballard Estate, Fort,
Bombay-1.
14. Sir Walter Michelmores,
Bird & Company (Pvt) Ltd.,
Chartered Bank Building,
4, Netaji Subhas Road,
Calcutta-1.
15. Mr. G. D. A. Fitzgerald,
Avery Co. of India Private Ltd.,
Ilaco House,
1 & 3, Brabourne Road,
Calcutta-1.
16. Mr. A. T. Montgomery,
Balmer Lawrie & Co. Ltd.,
21, Netaji Subhas Road,
Calcutta-1.
17. Mr. J. Nicholson,
Associate Electrical Industries (India) Pvt. Ltd.,
6, Mission Row,
Calcutta-1.
18. Mr. J. S. Balbert,
Associate British Machine Tool Makers (India) Ltd.,
6, Old Post Office Street,
Calcutta-1.
19. Mr. H. R. Gregson,
Associate Battery Mfrs. Eastern Ltd.,
59-C, Chowringhee Road,
Calcutta-20.
20. Mr. M. J. K. Sullivan,
Aluminium Manufacturing Co. Pvt. Ltd.,
2, Jessore Road,
Dum Dum.
21. Mr. J. G. Robinson,
Brooke Bond India Pvt. Ltd.,
2, Metcalfe Street,
Calcutta-13.
22. Mr. A. V. Niblett,
British Paints (India) Ltd.,
32, Chowringhee Road,
Calcutta-16.
23. Mr. R. J. Motte,
British Metal Corporation (India) Pvt. Ltd.,
22, Chittaranjan Avenue,
Calcutta-13.
24. Mr. K. J. Scott,
Britannia Biscuit Co. Ltd.,
15, Taratolla Road,
Calcutta-27.
25. Mr. J. E. Bingham,
Braithwaite & Co. (India) Ltd.,
7, Hide Road,
Kidderpore, Calcutta-23.

26. Mr. B. N. Lack,
Blackwood Hodge (India) Pvt. Ltd.,
139, Beliaghata Road,
Calcutta-16.
27. Mr. J. Chopra,
Burmah Shell Oil Storage & Distribution Co. of India Ltd.,
Hongkong House,
Dalhousie Square,
Calcutta-1.
28. Mr. G. M. Vibrat,
Heatly & Gresham Ltd.,
31, Chittaranjan Avenue,
Calcutta-12.
29. Sir H. M. L. Williams,
Guest, Keen, Williams Ltd.,
41, Chowringhee Road,
Calcutta-16.
30. Mr. P. E. G. W. Parish,
Gillanders, Arbuthnot & Co. Ltd.,
8, Netaji Subhash Road,
Calcutta-1.
31. Mr. T. G. May,
General Electric Co. of India Pvt. Ltd.,
Magnet House,
Chittaranjan Avenue,
Calcutta-13.
32. Mr. N. Eastwood,
Ford Rhodes, Parks & Company,
15, Chittaranjan Avenue,
Calcutta-13.
33. Mr. A. I. Murison,
Finlay, James & Co. Ltd.,
9, Lall Bazar Street,
Calcutta-1.
34. Mr. J. Luckham,
Dunlop Rubber Co. (India) Ltd.,
57-B, Free School Street,
Calcutta-16.
35. Mr. J. A. Finn,
Caltex (India) Ltd.,
Post Office Box No. 2382,
Calcutta.
36. Mr. T. M. Bishop,
Jepson Nicholson (India) Ltd.,
2, Fairlie Place,
Calcutta-1.
37. Sir John Brown,
Jardine Handerson Ltd.,
4, Clive Row,
Calcutta-1.
38. Mr. A. K. Sen,
Indian Oxygen Ltd.,
48, Diamond Harbour Road,
Alipore,
Calcutta-27.
39. Mr. F. A. Collet,
Imperial Tobacco Co. of India Ltd.,
37, Chowringhee Road,
Calcutta-16.

40. Mr. W. L. Grantham,
Lipton Ltd.,
9, Weston Street,
Calcutta-13.
41. Mr. H. Mackay Tallack,
Macneill & Barry Ltd.,
Calcutta-1.
42. Shri K. N. Mookerjee,
Leslie House,
19, Chowringhee Road,
Calcutta-13.
43. Mr. S. S. H. Sitwell,
Jessop & Co. Ltd.,
63, Netaji Subhas Road,
Calcutta-1.
44. Sir Brien Mookerjee,
Martin Burn Ltd.,
12, Mission Row,
Calcutta-1.
45. Mr. D. Hackney,
Mcgregor & Balfour Ltd.,
18, Netaji Subhas Road,
Calcutta-1.
46. Mr. H. K. S. Lindsay,
Metal Box Co. of India Ltd.,
Barlow House,
59 C, Chowringhee Road,
Calcutta-20.
47. Mr. S. L. Dass,
Stewarts & Lloyds of India Pvt. Ltd.,
41, Chowringhee Road,
Calcutta-16.
48. Shri G. D. Somani,
Shreeniwas House,
Waudby Road, Fort,
Bombay-1.
49. Shri R. Ramanathan Chettiar,
13, Ferozshah Road,
New Delhi.
50. Rai Bahadur G. M. Modi,
Chairman,
Modi Industries,
Modinagar (U.P.).
51. Shri D. C. Kothari,
"Oriental Building",
Armenian Street,
Madras-1.
52. J. R. Geib,
Standard-Vacuum Oil Co.,
6, Church Lane,
Post Box No. 146,
Calcutta-1.
53. Mr. R. Thirwell,
Mather & Platt Ltd.,
7, Hare Street,
Calcutta-1.

54. **Mr. A. H. Hume,**
Turner, Morrison & Co. Pvt. Ltd.,
6, Lyons Range,
Calcutta-1.
55. **Mr. W. E. Michell-Innes,**
Warren, James & Co. Ltd.,
31, Chowringhee Road,
Calcutta-16.
56. **Lala Bharat Ram,**
14/48, Diplomatic Enclave,
Kitchner Road,
New Delhi.
57. **Mr. B. F. Goodchild,**
Saxby & Farmer (India) Pvt. Ltd.,
17, Brabourne Road,
Calcutta-1.



70. **Rai Bahadur M. G. Rungta,**
F-16, Kalakar Street,
Calcutta-7.
71. **Shri Ratanlal M. Dave,**
M/s Vinay Cotton Co.,
170, Broadway,
Madras-1.
72. **Shri B. M. Birla,**
8, India Exchange Place,
Calcutta-1.
73. **Shri Babubhai M. Chinai,**
Baroda Rayon Corpn. Ltd.,
130-132, Great Western Bldg.,
Apollo Street,
Bombay-1.
74. **Shri Madanmohan R. Ruia,**
State Bank Building,
Bank Street, Fort,
Bombay-1.
75. **Shri K. I. Goenka,**
31, Netaji Subhas Road,
Calcutta-1.
76. **Shri Tulsidas Kilachand,**
M/s. Kilachand Devchand & Co.,
45-47, Apollo Street,
Fort, Bombay-1.
77. **Shri Shanti Prasad Jain,**
111, Clive Row,
Calcutta-1.
78. **Shri R. G. Saraiya,**
Navasari Chambers,
Outram Road, Fort,
Bombay-1.



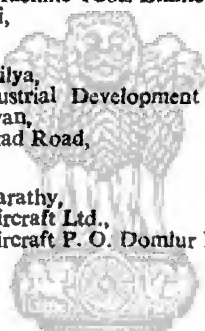
List of Important Industrialists and Managing Directors of Banks and Commercial Organisations

1. **Shri N. S. Vajifdar,**
Secretary & Treasurer,
State Bank of India,
Parliament Street,
New Delhi.
2. **A. M. Walker, Esq.,**
General Manager,
Punjab National Bank,
Parliament Street,
New Delhi.
3. **Shri B. P. Singh Roy,**
Chairman,
National Insulation Cable Co. Ltd.,
Nikko House,
Calcutta-1.
4. **Sir B. P. Singh Roy.**
Indian Steamship House,
21, Old Court House Street,
Calcutta-1.
5. **Shri Krimuthu Thitaraja Chettiar,**
Meenakshi Mills,
Madurai.

6. H. K. Ramaswamy Esq.,
Seshasayee Ltd.,
Tiruchirapalli,
Madras.
7. V. Ramakrishna Esq.,
Chairman,
K. C. P. Ltd., Mount Road,
Madras.
8. Shri M. C. T. Pethachari Chettiar,
Travancore Rayons Ltd.,
Alwaye.
9. Noel Todd Esq.,
Parry & Co.,
Esplanade,
Madras.
10. Shri T. S. Narayanaswami,
Indian Cement Ltd.,
Mount Road,
Madras.
11. Shri T. M. S. Mani,
Chairman & Managing Director,
Neyveli Lignite Corporation Ltd.,
Post Box 11, Neyveli, South Arcot Distt.
12. Smt. Maragatham Chandrasekhar,
National Small Industries Corporation Ltd.,
5E, Rani Jhansi Road,
Jhandewalan,
New Delhi.
13. Shri R. C. Dutt,
Managing Director,
National Coal Development Corporation Ltd.,
Darbhanga House,
Ranchi.
14. Shri K. S. Krishna Swami,
Managing Director,
National Buildings Construction
Corporation Ltd.,
Room No. 291, Block No. 8,
Shahjahan Road Hutments,
New Delhi-1.
15. Shri P. R. Nayak,
Managing Director,
Indian Refineries Limited,
State Bank Building,
11, Parliament Street,
New Delhi.
16. Shri Bhisham Arora,
Managing Director,
Indian Oil Company Ltd.,
Rashmi Carmichael Road,
Bombay-26.
17. Shri Sivananda Rau,
Managing Director,
Hindustan Teleprinters Ltd.,
Madras.
18. Shri J. M. Srinagesh,
Hindustan Steel Ltd.,
Secretariat Building, P.O. Hinoo,
Distt. Ranchi.

19. **Shri N. K. Sen Gupta,**
Managing Director,
Hindustan Cables Ltd.,
P. O. Hindustan Cables, Rupnarainpur,
Distt. Burdwan.
20. **Dr. K. Venkataraman,**
Hindustan Antibiotics Limited,
Pimpri, Near Poona.
21. **Dr. A. Nagaraja Rao,**
Chairman,
Heavy Engineering Corporation Ltd.,
Nepal Kothi, Doranda, Distt. Ranchi.
22. **Shri S. Sarangapany,**
Managing Director,
Heavy Electricals Ltd.,
Post Box No. 46, Bhopal.
23. **Shri B. C. Mukerji,**
Managing Director,
Fertilizer Corporation of India Ltd.,
157/48, Diplomatic Enclave,
New Delhi.
24. **Shri B. V. Baliga,**
Managing Director,
Bharat Electronics Ltd.,
Jalahalli P.O.,
Bangalore.
25. **Mr. N. K. Karanjia,**
General Manager,
Central Bank of India Ltd.,
Fort, Bombay.
26. **Shri T. Kansara,**
General Manager,
Bank of India,
Fort, Bombay.
27. **Shri N. M. Choksi,**
General Manager,
Bank of Baroda,
Bombay.
28. **Shri S. P. Sadasivan,**
General Manager,
United Commercial Bank Ltd.,
2-India Exchange Place,
Calcutta.
29. **Mr. A. R. Foster,**
Imperial Chemical Industries (India) Pvt. Ltd.,
34, Chowringhee Road,
Calcutta-16.
30. **Mr. N. Stenhouse,**
Andrew Yule & Co. Ltd.,
8, Clive Row,
Calcutta-1.
31. **Mr. H. V. R. Iyengar,**
Governor,
Reserve Bank of India,
Bombay.

32. Mr. P. Gopalakrishnan,
Chairman,
Life Insurance Corporation of India,
Jeevankendra, Bombay-1.
33. Mr. J. Vyoral,
Managing Director,
Bata Shoe Co. (P) Ltd.,
Calcutta.
34. Shri A. N. Khosla,
Joint Agent,
TISCO,
Jamshedpur.
35. A. E. L. Collins Esq.,
Managing Director,
Ashok Leyland Ltd.,
Madras.
36. Shri S. N. Bilgrami,
Managing Director,
State Trading Corporation of India Ltd.
Express Building, Mathura Road,
New Delhi-1.
37. Shri K. L. Ghei,
Hindustan Machine Tools Limited,
P.O. Jalahalli,
Bangalore.
38. Shri D. Sandilya,
National Industrial Development Corporation Ltd.,
Udyog Bhavan,
Maulana Azad Road,
New Delhi.
39. Shri R. P. Sarathy,
Hindustan Aircraft Ltd.,
Hindustan Aircraft P. O. Domlur Road,
Bangalore.



सत्यमेव जयते

APPENDIX II
Summary of Replies Received (Industry-wise) Regarding Number of Persons Employed and Number of Managerial Personnel Classified under Various Categories

Sl. No.	Name of Establishment	Total No. of Persons in Employment	No. of Managerial Personnel Employed in the Establishment		Percentage of Managerial Personnel to Total Personnel Employed					
							Technical Management		Other Categories	
			*P.M.	@C.M. + G.M.			*P.M.			
1	2	3	4	5	6	7	8	9	10	
A. ENGINEERING										
1.	Tata Iron & Steel Co., Jamshedpur ..	38,394	101	41	21	83	27	.11	.27	
2.	Hindustan Steel Limited ..	55,000	1,795	485	135	158	3.29	.88	.53	
3.	Heavy Machine Building Project, Ranchi ..	1,832	—	18	26	3	—	.98	1.57	
4.	Foundry Forge Project ..	823	29	8	—	—	3.52	.97	—	
5.	Heavy Machine Building Project ..	335	4	—	—	—	1.19	—	—	
6.	Coal Mining Machinery Project, Durgapur ..	550	44	15	—	—	8.00	2.73	—	
7.	Metal Box Company of India Ltd. ..	6,979	65	2	55	26	.93	.03	1.16	
8.	Jessop & Co., Calcutta ..	11,000	13	14	14	5	.12	.12	.17	
9.	Mather & Platt, Calcutta ..	150	1	1	—	—	.67	.67	—	
10.	Hindustan Teleprinters Ltd., Madras ..	100	4	—	1	—	4.00	—	1.00	
11.	Amin Chand Payare Lal, Chandigarh ..	715	1	2	3	3	.14	.28	.84	
12.	Bharat Electronics, Bangalore ..	2,118	56	7	17	7	2.64	.33	1.13	
13.	New Standard Engineering Co., Bombay ..	1,800	12	1	3	2	.67	.06	.30	
14.	Guest, Keen, Williams Ltd., Calcutta ..	7,215	42	23	29	16	.58	.32	.63	
15.	Ashok Leyland Limited, Madras ..	2,427	7	4	8	6	.29	.14	.58	
16.	Stewarts & Lloyds of India Pvt. Ltd., Calcutta ..	1,842	4	—	15	1	.23	—	.89	
17.	Indian Tube Co. Limited, Calcutta ..	2,431	16	5	21	5	.66	—	1.07	
18.	Burn & Company Limited, Calcutta ..	8,800	12	5	5	2	.14	.06	.08	

A-I. ENGINEERING CONSTRUCTION

19. National Buildings Construction Corporation, New Delhi	135	—	—	2	—	—	29
--	-----	---	---	---	---	---	----

B. TEXTILES

20. Sarangpur Cotton Manufacturing Company, Ahmedabad	4,000	10	2	5	—	25	26
21. Mohini Mills Ltd., Calcutta	3,200	6	1	—	—	19	12
22. Podar Mills Ltd., Bombay	2,460	4	—	1	—	16	12
23. Shakti Mills, Bombay	726	3	—	1	—	41	55
24. Delhi Cloth Mills, Delhi	18,000	232	47	66	—	128	65

C. CHEMICAL INDUSTRIES

25. E. I. D. (Parry Group)	20,000	28	—	38	—	14	19
26. Alembic Chemical Works, Bombay	2,134	25	16	16	—	17	94
27. Dhurangdhra Chemical Works, Bombay	2,323	3	2	4	—	13	30
28. Fertilizer Corporation of India, Sindhri	9,293	63	—	19	—	67	28
29. Fertilizer Corporation, Nangal	2,838	40	6	12	—	14	58
30. Fertilizer Corporation, Trombay	566	23	—	7	—	406	159
31. Fertilizer Corporation, Kamrup Division	70	—	2	3	—	—	10
32. Imperial Chemical Industries Ltd., Calcutta	6,000	84	93	210	—	14	81

D. MINING INDUSTRIES

33. Bengal Coal Company, Calcutta	27,000	151	10	11	—	56	08
34. Neyveli Lignite Corporation Ltd., Neyveli	29,000	12	2	5	—	04	03
35. National Coal Development Corporation, Ranchi	11,713	127	109	46	—	108	85

E. OIL INDUSTRIES

36. Caltex Limited, Bombay	3,874	7	—	7	—	18	37
37. Indian Refineries Ltd., New Delhi	1,516	15	98	23	—	99	277
38. Burmah Shell, Bombay	12,500	128	—	235	—	102	507

*P.M. stands for Production Management.

@C.M. stands for Commercial Management.

+G.M. stands for General Management.

APPENDIX II—*contd.*

1	2	3	4	5	6	7	8	9	10
F. CEMENT									
39.	Indian Cements Ltd., Madras ..	1,887	2	2	5	7	.11	.11	.33
G. SMALL SCALE INDUSTRIES									
40.	National Small Industries Corporation, New Delhi	142	45	1	63	32	31.69	.71	66.90
H. MISCELLANEOUS INDUSTRIES									
41.	Imperial Tobacco Co., Calcutta	10,000	131	39	183	59	13.1	.39	2.42
42.	Britannia Biscuit Co., Calcutta	2,000	9	—	8	10	.45	—	.9
43.	Brooke Bond, Calcutta	7,804	32	4	124	20	.41	.05	1.84
44.	Hindustan Pilkington Glass Works Ltd., Calcutta	650	6	—	5	2	.92	—	1.01
45.	National Rubber Manufacturers Ltd., Calcutta	1,900	12	12	20	15	.64	.74	1.83
46.	Indian Oxygen Ltd., Calcutta	3,700	24	8	59	25	.65	.22	2.27
47.	Punjab National Bank Ltd., Delhi	10,540	—	—	—	1,800	—	—	17.08
48.	Andrew Yule & Co., Calcutta	703	—	4	22	27	—	.57	6.97
49.	State Trading Corporation of India	2,007	—	—	184	65	—	—	12.45
50.	Aluminium Mfg. Co.	1,000	5	—	5	—	.5	—	.5
51.	James Warren & Co.	405	3	—	3	6	.74	—	2.22

APPENDIX III

Location-wise Distribution of Industries Pertaining to Mechanical & Electrical Machinery, Equipment & Managerial Personnel Required for Their Contemplated Development

Sl. No.	Type of Industry	Name of the Concern	Additional Managerial Personnel Required	
			Technical & Management	General & Commercial
1	2	3	4	5
JAMSHEDPUR				
1.	Paper making Plant & Machinery	Tata Engg. & Locomotive Co.	16	16
2.	Structural Cranes	M/s, Indian Hume Pipe Co.	4	4
3.	Barth Moving Machinery and Equipment	Tata Engg. & Locomotive Co.	20	20
4.	Do.	Tractor & Bulldozers Co.	40	40
5.	Do.	Track Parts of India Co.	20	20
6.	Chemical Plants	Tata Engg. & Locomotive Co.	3	3
7.	Diesel Engine	Do.	4	4
8.	Structural Cranes	Do.	3	3
9.	Locomotives	Do.	—	—
SAHABAD				
1.	Machinery & Equipment	Associated Cement Co.	8	8
2.	Complete continuance type of Solvent Extractor Plant	Do.	4	4
TITAGHUR				
1.	Paper making Plant & Machinery	F. W. Heilgers Co.	12	12
2.	Self Doffing Silver Spinning Frames	Britannia Engg. Co.	—	—
3.	H. S. Centrifugal Frames etc.	Do.	—	—
4.	Structural Cranes	Do.	—	—
5.	Road Rollers	Do.	—	—
6.	Flat Bed Machines and Platen Press	Do.	—	—
7.	Tea Processing Machinery	Marshall Sons & Co.	—	—
BOMBAY				
1.	Small & Medium Scale Pulp	Paper Mill Plant Ltd.	4	4
2.	Oliver Brown Stock Washing System	Garlick & Co.	4	4

APPENDIX III—*contd.*

1	2	3	4	5
3.	Components of Paper & Pulp Machines	Dyonacraft Machine Co.	3	3
4.	General Item of Sugar Mill Machine	M/s. W. H. Brady & Parel Co.	3	3
5.	Baby Boilers Packers Boilers	M/s. Nestler Boilers Pvt.	3	3
6.	Stocks for Boilers	M/s. New Standard Engg. Co.	3	3
7.	Cochran Boilers	M/s. Structural Engg. Co.	4	4
8.	Ring Frames etc.	M/s. National Machines Co.	130	130
9.	Looms	M/s. Cooper Engg. Co.	75	75
10.	Blow Rooms Machine	M/s. New Standard Engg. Co.	3	3
11.	Silk Looms	Inventors Corporation	15	15
12.	Sizing Machines	M/s. Associated Textile	3	3
13.	Silk Looms & Cotton Looms	M/s. Ravi & Co.	50	50
14.	Solvent Extractor Plant ..	Larson & Toubro Ltd.	4	4
15.	Do.	Vasant Industrial Engg. Works	4	4
16.	Do.	Scindia Workshops	3	3
17.	Structural Cranes	M/s. Structural Engg. Co.	3	3
18.	Do.	New Standards Engg. Co.	3	3
19.	Do.	M/s. Alcock Asdown Ltd.	3	3
20.	Do.	M/s. Testeels	3	3
21.	Do.	Indian Hume Pipe Co.	3	3
22.	Do.	Structural Engg. Co.	3	3
23.	Do.	Hindustan Construction Co.	3	3
24.	Do.	M/s. B. R. Harman & Co.	4	4
25.	Do.	Indian Tube Mills	4	4
26.	Do.	M/s. National Steel Works	4	4
27.	Do.	National Engg. Works	4	4
28.	Do.	Garlick & Co.	4	4
29.	Do.	M/s. Shahani and Engg. Works	3	3
30.	Do.	M/s. International Works	3	3
31.	Do.	M/s. Brady Engg. Co.	3	3
32.	Do.	M/s. Western India Engg. Co.	3	3
33.	Do.	M/s. Standard Rolling Shutters	3	3
34.	Do.	M/s. Indus Engg. Co.	3	3
35.	Do.	M/s. Monji Shaniji Co.	3	3
36.	Do.	Saurashtra Engg. Corpn.	3	3
37.	Do.	M/s. Elect. & Mech. Appliance	3	3
38.	Do.	M/s. Mapara Parekh Co.	3	3
39.	Do.	M/s. Novens Engg. Works	3	3
40.	Do.	Western Mech. Industries	3	3
41.	Do.	Swastik Rolling Shutters	3	3
42.	Do.	Nav Bharat Udyog Co.	3	3
43.	Do.	Khira Steel Ltd.	3	3
44.	Do.	John. T. Jardaker	3	3
45.	Do.	Gannon Dunkerly & Co.	8	8
46.	Do.	Mulchand Narotamdas Co.	8	8
47.	Do.	Structural Engg. Co.	4	4
48.	Do.	K. T. Steel Co.	3	3
49.	Do.	Hindustan Construction Co.	3	3
50.	Do.	Virdi Iron & Steel Co.	3	3
51.	Do.	National Engg. Works	3	3

APPENDIX III—*contd.*

1	2	3	4	5
52.	Structural Cranes	Brady Engg. Co.	3	3
53.	Do.	New Standard	3	3
54.	Do.	Mackerji (P) Ltd.	3	3
55.	Do.	New Standard Engg. Co.	3	3
56.	Do.	Khandelwal Udyog Co.	3	3
57.	Tract Parts of Crawler	Automobile & Agriculture	40	40
58.	Tractamount Roller ..	Kammani Engg. Corpn.	4	4
59.	Plants for Sulphuric Acid ..	Tee Steels (P) Ltd.	4	4
60.	Plants for Sulphuric Acid ..	National Rayons	6	6
61.	Water Purification Plant ..	Hindustan Construction Co.	6	6
62.	Chemical Machinery ..	Vasant Industrial Engg. Co.	3	3
63.	Do.	Indo Berilion	3	3
64.	Plants for Sulphuric Acid ..	Larson & Toubro Co.	7	7
65.	Chemical Machinery ..	Gannon & Dunkerley Co.	3	3
66.	Pressure Vessels ..	Scindia Workshops	—	—
67.	Plants for Nitric Acid ..	Chemical Plant Mfg. Co.	16	16
68.	Centrifuge ..	East-Asiatic Co.	3	3
69.	Fixer etc. ..	New Standard Engg. Co.	6	6
70.	Dryers etc. ..	Parleys (P) Ltd.	3	3
71.	Autoclave etc. ..	Garlick & Co.	3	3
72.	Pressure Vessels ..	Richardson & Cruddas Co.	3	3
73.	Stirrers Reaction ..	Orion Engg. Works	3	3
74.	Bottle Filling Machine ..	Fedrick Herbert Co.	3	3
75.	Pressure Vessel ..	Lidant Electric Co.	3	3
76.	Ball Mill etc. ..	K. Mahadev Co.	3	3
77.	Autoclave etc. ..	Dalal Engg. Co.	3	3
78.	Vessel Tank ..	Metal Fabric	4	4
79.	Tables Making Machine ..	Universal Mechanical	3	3
80.	Centrifugal Pump ..	Brady Engineering Co.	3	3
81.	Petrol Dispensing Pumps ..	Mercantile Industrial Development Corporation.	3	3
82.	Centrifugal up to 3 1/2" ..	National Electrical Industries	—	—
83.	Centrifugal up to 6" & Deep Sellturbine	Ræstom & Hornsby	—	—
84.	Centrifugal up to 4" ..	Shri Ram Mills Co.	—	—
85.	Centrifugal up to 6" ..	Pumps Mfg. Corporation	3	3
86.	Petrol Dispensing Pumps ..	Larsen & Toubro Co.	—	—
87.	Deepwell Turbine Submersible Pumps	Mody Bros.	—	—
88.	Petrol Dispensing Pumps	Tahira Industries	3	3
89.	Centrifugal & Deep Well Turbine	K.S.B. Pump (P) Ltd.	3	3
90.	Centrifugal up to 100" ..	A.C.C.	—	—
91.	Pneumatically operated pumps	Consolidated Pneumatic Co.	—	—
92.	Lubricating pumps ..	Indequip (P) Ltd.	4	4
93.	Ver 6/7 & 9/12 H.P. ..	James Beechy	—	—
94.	Vert 6 H.P. ..	Mazgaon Docks Ltd.	—	—
95.	Vert 12 BHP ..	Mahindra & Mahindra Co.	3	3
96.	Hor 10 to 15 H.P. ..	Indian National Diesel Co.	—	—
97.	Hor 6, 8 & 10 H.P. ..	Indian Commercial Co.	—	—
98.	Vert 160/655 ..	T. Maneklal Mfg. Co.	3	3
99.	Vert 85 B.H.P. ..	Automobile Products Ltd.	—	—

APPENDIX III—*contd.*

1	2	3	4	5
100.	Oil Immersed Worm & Communication & Power Equip. Reduction Gear Boxes Co.	—	—	—
101.	Worm Reduction Gear etc. ..	Essential Engg. Co.	—	—
102.	Piv Gears	Indian Standard Metal Co.	—	—
103.	Concrete Mixers	Miller's Timber & Trading Co.	4	4
104.	Concrete Vibrator	Aron Strong Smith Co.	3	3
105.	Do.	Meckenzie's Ltd.	3	3
106.	Stone Crusher	Garlick & Co.	3	3
107.	Weighbatcher Tav Boilers ..	New Standard Engg. Co.	3	3
108.	Flexible Shaft Vibrator ..	Killick Nixon Co.	3	3
109.	Pneumatic Concrete Vibrator ..	Consolidated Pneumatic Tools Co.	3	3
110.	Concrete Mixers	Khandelwal Udyog	6	6
111.	Motorised Grinders	National Elect. Industries	—	—
112.	Horizontal Metal Cutting Band-saw	Garlick & Co.	—	—
113.	Pneumatic Tools	Consolidated Pneumatic Tools Co.	—	—
114.	Panel Pin Making	K. T. Steel Industries	—	—
115.	Presses & Sheers	Godrej & Boyce Co.	—	—
116.	Drilling Machines	New Standard Engg. Co.	—	—
117.	Plator Bending Machines ..	Do.	—	—
118.	Hacksaw Machines	Do.	—	—
119.	Pneumatic Hammer's Presses	Hadevkar Metal Pressing Works	—	—
120.	Portable Electric Tools ..	Ralliwolf Private Ltd.	—	—
121.	Lathes, Drilling Machine ..	Investa Machine Tools Co.	—	—
122.	Special purpose metal cutting machines	East Asiatic Co.	6	6
123.	Lathes	Hasanbhoy Jetha Co.	—	—
124.	Furnaces	Western Mechanical Industries	—	—
125.	Lathes	Ravi Industries Ltd.	3	3
126.	Furnaces	Ofu-lynx Pvt. Ltd.	6	6
127.	Metal Cutting Bandsaw ..	Crescent Iron & Steel Corporation	—	—
128.	Screw & Hydraulic Press ..	Crescent Iron & Steel Corporation	3	3
129.	Planing Machines	Eastern Machinery Co.	3	3
130.	Wood-working machinery ..	Janta Machinery Tools Co.	3	3
131.	Flexible Shaft Equipment ..	Forbes & Forbes Co.	3	3
132.	Moulding Machine	M/s. Modern Foundry & Machine Works.	3	3
133.	Do.	M/s. Pioneer Equipment Co.	3	3
134.	Blasting Extruding etc. Machines	M/s. Supreme Industries Ltd.	3	3
135.	Plastic Injection	M/s. Arvind Engg. Co.	—	—
136.	Industrial & Elect. Furnaces ..	M/s. Steel Plant Ltd.	—	—
137.	Automatic Lathes	M/s. Perfect Machines Co.	4	4
138.	Precision Longturning & Screwing Automatic.	M/s. Crescent Agencies	3	3
139.	Lathes etc.	M/s. Mahindra Oven (P) Ltd.	3	3
140.	Industrial & Elect. furnaces ..	M/s. Shri M. S. Malaney Co.	3	3
141.	Threading Machines	M/s. Textubes Mech. Industries Ltd.	3	3
142.	Surface Grinders	M/s. S. S. Miranda, Co.	3	3
143.	Reciprocating-type Air Compressors	Atlas Corp.Co.	3	3

APPENDIX III—contd.

1	2	3	4	5
144.	16300 Cfm. Rotary Air Compressors	Consolidated Pneumatic Tools Co.	—	—
145.	160, 220, 500 Cfm. Stationary Rotary Air Compressors	T. Maneklal Mfg. Co.	—	—
146.	7, 5, 15, 46 & 91 Cfm. Stationary Rotary Air Compressors	New Standard Engg. Co.	—	—
147.	50, 56, 86, 100, 120 Cfm. Stationary Rotary Air Compressors	Shri Ram Mills Ltd.	—	—
148.	1.5 to 40 Cfm. Stationary Rotary Air Compressors	Surindra Industries (P) Ltd.	12	12
149.	Rly. Wagon Parts and Motor Parts	M/s. C. K. Industries Ltd.	—	—
150.	Rly. Fittings & Components ..	M/s. Malleable Iron & Steel Co.	—	—
151.	Rly. Equipment	M/s. India Tube Mills	—	—
152.	Buffer Plunger	M/s. Mukund Iron & Steel Co.	—	—
153.	Do.	M/s. Krishna Steel Industries	—	—
154.	Belt Conveyors etc.	Dynacraft Machine Co.	—	—
155.	Do.	Elecon Engg. Co.	—	—
156.	Conveying Equipment	Western Mechanical Industries	—	—
157.	Do.	International Combustion India (P) Ltd.	6	6
158.	Do.	Gannon Dunkerley & Co.	4	4
159.	Belting	M/s. Oriental Rubber Industries Ltd.	—	—
160.	Fort Lifts Trunk Battery ..	M/s. Godrej & Boyce Co.	6	6
161.	Lifts	M/s. Joatis Elevator Co.	—	—
162.	Lifts	M/s. J. J. Engg. Co.	—	—
163.	Rubber Insulated Cables ..	M/s. Premier Rubber & Cables Industries	4	4
164.	C.T.S. Wire	Do.	4	4
165.	ViR wires	M/s. Devidayal Cable Industries (P) Ltd.	4	4
166.	ViR & CTS Cables	M/s. Bombay Cable Co.	—	—
167.	Protodur Cables	M/s. Cable Corporation Ltd.	—	—
168.	Insulated Cables	M/s. Swastic Rubber	—	—
169.	Rubber Insulated Cables ..	M/s. Bharat Cables Co.	—	—
170.	ViR & CTS Wires	M/s. Insulated Wires Co.	3	3
171.	Rubber & Plastic Cables ..	M/s. Henleys Telegraph Works	4	4
172.	Electric Cables	M/s. Diamond Rubber Works	4	4
173.	PVC Synthetic	M/s. Power Cables (P) Ltd.	—	—
174.	ViR & CTS Cables	M/s. Asian Cables Corp'n.	3	3
175.	Do.	M/s. Electro Wire Co.	3	3
176.	PVC Coated Wires	M/s. Ahmedabad Mfg. Co.	3	3
177.	ViR Insulated Cables	M/s. Agfa Rubber Co.	3	3
178.	ViR & PVC Cables	M/s. Korula Rubber Co.	—	—
179.	Paper Insulated Cables ..	M/s. Cable Corporation	3	3
180.	Do.	M/s. Asian Cables Co.	3	3
181.	A.C.S.R. & Acc.	M/s. Power Cables Co.	—	—
182.	A.C.S.R.	M/s. Devidayal Cables Co.	4	4
183.	Bore Copper Conductor ..	M/s. Jayant Metal Mfg. Co.	4	4
184.	Enamelled Copper Wire ..	M/s. Hindustan Transmission Co.	—	—
185.	Do.	M/s. Devidayal Cable Co.	—	—
186.	Cotton & Paper Covered Wire etc.	Ms. Shri Shakti Trading Co.	—	—

APPENDIX III—*contd.*

1	2	3	4	5
187.	Copper Wires & Strips ..	M/s. Jayant Metal Mfg. Co.	3	3
188.	Synthetic Enamelled Copper Wire.	M/s. Evcalite Insulating Pvt. Ltd.	3	3
189.	Enamelled Copper Wire ..	M/s. Asian Cable Corpn.	3	3
190.	Paper Cotton & Silk, ..	M/s. Wadleside National Conductors Co.	3	3
191.	Enamelled Copper Wires ..	M/s. Jyoti Wire Industries	3	3
192.	Do.	M/s. Ajit Industries	3	3
193.	Synthetic Copper Wires ..	M/s. Enamelled Wire Ltd.	—	—
194.	Slipring Motors ..	M/s. Bharat Bijlee Ltd.	—	—
195.	Electric Motors ..	M/s. Crompton Parkinson Co.	—	—
196.	Do.	M/s. Ogale Glass Works	—	—
197.	Do.	M/s. New India Electric Corporation	5	5
198.	Do.	M/s. National Electrical Industries Ltd.	16	16
199.	Transformer	M/s. Gandhi Electrical Co.	—	—
200.	Transformer	M/s. Crompton Parkinson Co.	—	—
201.	Transformer	M/s. Radio Lamp Works	—	—
202.	Transformer	M/s. National Elect. Industries Ltd.	6	6
203.	Transformer	M/s. Bharat Bijlee Ltd.	—	—
204.	Switchgear	M/s. Jyoti Ltd.	—	—
205.	Metalclad Switch Fuse Gear Unit	M/s. Engg. Products Ltd.	4	4
206.	Power Switches & Circuit Breakers	M/s. Hindustan Klockners Co.	—	—
207.	H.T. Circuit Breakers ..	M/s. Crompton Parkinson Co.	6	6
208.	Switchboard & Control ..	M/s. Bharrat Mfg. Co.	—	—
209.	Motor Starter ..	M/s. Larsen & Toubro Co.	4	4
210.	Do.	M/s. Voltas Ltd.	4	4
211.	Do.	M/s. Kiron Textile Ltd.	4	4
212.	Iron-clad Switches etc. ..	M/s. Electrical Instruments Mfg. Co.	8	8
213.	Motor Starter	Ms. Siemen Engg. Co.	6	6
214.	Do.	M/s. National Supply & Distribution Agency.	4	4
215.	Do.	M/s. Ellora Art Industries	4	4
216.	Metal-clad Switches ..	M/s. Investors Industries Corporation	4	4
217.	Fans & Blowers ..	Western Mech. Industries	—	—
218.	Do.	Air Con. Industries Ltd.	—	—
219.	Do.	New Standard Engg. Co.	—	—
220.	Roots Blowers ..	T. Maneklal Mfg. Co.	4	4
ROURKELA				
1.	Pulp & Paper-making ..	Utkal Machinery Ltd.	—	—
2.	Structural Cranes ..	Eastern Structural (P) Ltd.	—	—
3.	Chemical Machine ..	Utkal Machinery Ltd.	—	—
DALMIANAGAR				
1.	Pulp & Paper-making ..	Rohtas Industries Ltd.	4	4
2.	General Items (Mill) ..	Do.	3	3

APPENDIX III—contd.

1	2	3	4	5
POONA				
1.	Pulp & Paper-making ..	Paper & Pulp Conversion Ltd.	3	3
2.	Gear Industry	David Brown Co.	—	—
3.	Structural Cranes ..	Copper Engg. Ltd.	—	—
4.	Air & Gas Compressors ..	Kirloskar Pneumatic Tools	—	—
5.	Dairy Machinery ..	Vulkan Trading Co.	—	—
6.	Do.	Agfa Laval (I) Pvt. Ltd.	—	—
CALCUTTA				
1.	Paper Making Plant & Machinery	Eastern Paper Mills Ltd.	3	3
2.	Do.	Port Engg. Works	3	3
3.	Vacuum Pans etc.	Port Engineering Works	3	3
4.	General Items	M/s. Bery Bros.	3	3
5.	Carding Engine	M/s. Machine Manufacturing	15	15
6.	Do.	M/s. Textile Machinery	50	50
7.	Card & Cill Pins	Indian Pin Manufacturing Co.	—	—
8.	Finished Jute Machine ..	Lagan Machinery Co.	—	—
9.	Reeds Camb	M/s. Reed Camb. Ltd.	4	4
10.	Hackle & Combing Pins ..	Ms. Spinning Accessories	—	—
11.	Spare Parts for Mill Machine	M/s. Vijay Engg. Co.	—	—
12.	Machinery Parts Spares for Jute Mills	M/s. Fort Glostea Co.	—	—
13.	Jute Machinery Spares ..	M/s. Free India Iron & Steel Ltd.	—	—
14.	Do.	M/s. Port Engineering Works	—	—
15.	Do.	Pioneer Iron Corporation	—	—
16.	Haulage (up to 40 H.P.) ..	Kilburn Co. (Pvt.)	3	3
17.	Do.	C-Comens & Sons	3	3
18.	Coal Washery	Britannia Engg. Co.	8	8
19.	Rice Bran Plant	Schanting Agencies	4	4
20.	Structural Cranes	M/s. Structural Engg. Works	3	3
21.	Do.	M/s. Burn & Co.	3	3
22.	Do.	Electrical Manufacturing	3	3
23.	Do.	Hindustan Motors Ltd.	3	3
24.	Do.	Indian General Navigation Ltd.	3	3
25.	Do.	Modern Indian Construction Ltd.	4	4
26.	Do.	Hindustan Development Corporation	4	4
27.	Do.	Garden Reach Workshop	4	4
28.	Do.	Associated Aesby Industries	4	4
29.	Do.	M/s. Mansfield Ril Gas Co.	3	3
30.	Do.	James Alexander Co.	3	3
31.	Do.	Jindal India Co.	3	3
32.	Do.	B.S. Engineering Corporation	3	3
33.	Do.	M/s. Shalimar Works	3	3
34.	Do.	Damodar Enterprises	3	3
35.	Do.	arts & Lloyds Co.	3	3

APPENDIX III—*contd.*

1	2	3	4	5
36.	Structural Cranes	Howrah Engineering Concern Co.	3	3
37.	Do.	British India Electrical Co.	3	3
38.	Do.	East Bengal Engineering Co.	3	3
39.	Do.	Anand Metal	3	3
40.	Do.	Banwari Lal Purshotam Dass Co.	3	3
41.	Do.	Orient Supply Syndicate Co.	3	3
42.	Do.	Hindustan Sheet Ltd.	3	3
43.	Do.	Raymon Engineering Works	8	8
44.	Do.	Britannia Buildings Co.	4	4
45.	Do.	Barakar Engineering & Foundry Co.	4	4
46.	Do.	Hindustan Motors Ltd.	3	3
47.	Do.	Bridge & Roof Co.	3	3
48.	Do.	Engineer Union	3	3
49.	Do.	Ajitasavia Iron & Steel Co.	3	3
50.	Do.	Harbans Lal Vcd Prakash Co.	3	3
51.	Do.	Hindustan Steel & Metal Industries	3	3
52.	Do.	Lynx Machinery Co.	3	3
53.	Furrow Plough	Kumar Iron & Steel Co.	3	3
54.	Mechanical Plough	Marshall & Sons Engg. Development (P) Ltd.	5	5
55.	Road Rollers Diesel	M/s. Jessop & Co.	6	6
56.	Do.	M/s. Agrind Fabrication Co.	—	—
57.	Water Purification Plant	Jewell Filler Co.	3	3
58.	Do.	J. Stone & Co.	3	3
59.	Chemical Machine	A.P.V. Engineering Co.	3	3
60.	Pressure Vessels	Indian General Navigation Co.	3	3
61.	Autoclave Crystalliser	Chemical Plant & Equipment Ltd.	3	3
62.	Do.	Corporated Engineer Ltd.	3	3
63.	Do.	Lilna Iron Works	3	3
64.	Ballmill	Kusum Engineering Co.	3	3
65.	Do.	Hind Galvanizing Engg. Co.	4	4
66.	Centrifugal up to 4'	Associated Electrical Industries Ltd.	—	—
67.	Centrifugal & Reciprocating Pump	Bengal Iron Works British Electrical Pump	—	—
68.	Centrifugal up to 11"	Eastern Electrical Co.	—	—
69.	Turbine Pumps	Macnal Berry & Co.	—	—
70.	Centrifugal up to 4'	Roger Engineering Works	—	—
71.	Do.	Sur Iron & Steel Co.	3	3
72.	Printing Press	M/s. Indian Machine Co.	3	3
73.	Platen Press	M/s. Maya Engg. Co.	3	3
74.	Gear Industry	Deepak Industries Co.	—	—
75.	Building & Road Construction	Marshall Sons & Co.	—	—
76.	Do.	Lynx Machinery Co.	—	—
77.	Do.	C-Comens & Sons Co.	—	—
78.	Do.	Sur Iron & Steel Co.	4	4
79.	Tea Processing Machinery	Britannia Engineering Co.	—	—
80.	Do.	British India Electric Co.	—	—

APPENDIX III—contd.

1	2	3	4	5
81.	Tea Processing Machinery ..	Laxmi Narayan Engg. Co.	—	—
82.	Machine Tools	Indian Oxygen Co.	—	—
83.	Do.	Metal Box Co.	—	—
84.	Power Driven Pumps ..	Harbans Lal Malhotra Co.	—	—
85.	Do.	Maya Engg. Works	—	—
86.	Structural Cranes ..	Hotman Climax Manufacturing Co.	4	4
87.	Do.	Binani Metal Works	—	—
88.	Do.	Atlas Works	—	—
89.	Do.	Shri Hanuman Industry Co.	—	—
90.	Do.	Associated Electrical Industries Manufacturing Co.	—	—
91.	Do.	Machinery Manufacturing Corporation.	6	6
92.	Do.	O.F.U. Lynx (P) Ltd.	6	6
93.	Do.	Britannia Engineering Co.	3	3
94.	Do.	M/s. Bharat Minerals Sales Co.	—	—
95.	Do.	M/s. Naokhali Machine Tool Co.	3	3
96.	Do.	M/s. Industrial Gases Co.	3	3
97.	Do.	E.M. Co.	3	3
98.	Do.	Ballabram Badrinarayan Co.	3	3
99.	Do.	Heroes Engg. Works	4	4
100.	Do.	R. L. Raggaria Co.	3	3
101.	Do.	M/s. Supercrafts Co.	3	3
102.	Do.	Shri N. S. P. Iyer Co.	3	3
103.	Do.	Industrial Machine Co.	3	3
104.	Do.	Plastic Moulder Co.	3	3
105.	Do.	Gopaldas Baqri Co.	3	3
106.	Do.	Beni Engineering Works	3	3
107.	Air & Gas Compressors ..	Holman Climax Manufacturing Co.	—	—
108.	Do.	Hindustan Gas Co.	3	3
109.	Machinery & Refractory ..	Kusum Engineering Co.	—	—
110.	Locomotive Wagons & Railway Equipment	Stone & Co.	8	8
111.	Do.	Saxby & Farmer Co.	4	4
112.	Do.	Jessop & Co.	—	—
113.	Do.	Bridge & Roof Co.	—	—
114.	Do.	Brathwaite & Co.	—	—
115.	Do.	Indian Standard Wagon Co.	—	—
116.	Do.	Burn & Co.	—	—
117.	Do.	Grasham & Craven Co.	—	—
118.	Do.	Shree Engineering Products Co.	—	—
119.	Do.	M/s. J. Stone Co.	60	60
120.	Do.	Raymon Engineering Co.	40	40
121.	Do.	Howrah Engineering Co.	—	—
122.	Do.	Precision Engg. Works	—	—
123.	Do.	Burn & Co.	—	—
124.	Do.	Kumardhubi Engg. Co.	—	—
125.	Elevators & Conveyors ..	Rosets Mechan & Co.	5	5
126.	Do.	William Power & Sons	6	6

APPENDIX III—*contd.*

1	2	3	4	5
127.	Elevators & Conveyors	Hindustan Sheet & Metal Co.	4	4
128.	Do.	Mecnil & Barry Co.	—	—
129.	Do.	Wesman Engg. Co.	—	—
130.	Do.	Comens & Co.	4	4
131.	Rubber Conveyor Belting ..	East India Rubber Co.	—	—
132.	Do.	Dunlop Rubber Co.	—	—
133.	Mobile Cranes ..	Tractors India Ltd.	4	4
134.	Fork Lift Trucks ..	Carter Porter Co.	—	—
135.	Industrial Goods Lifts ..	Electric Construction Co.	—	—
136.	Electric Motors ..	Calcutta Fan Works	3	3
137.	Do.	Engineering Works	12	12
138.	Do.	Orient General Industries Co.	20	20
139.	Transformers ..	Electric Construction Co.	—	—
140.	Industrial Engines ..	Aeronautical Services Co.	—	—
141.	Do.	Nundi & Co.	3	3
142.	Do.	Lynx Machinery Co.	5	5
143.	Industrial Fan & Blowers ..	Air Conditioning Corporation	—	—
144.	Do.	Davidson of India Co.	—	—
145.	Do.	Wesman Manufacturing Co.	—	—
146.	Do.	Veymer & Bageshwari Co.	4	4
147.	Do.	S. E. Products Co.	4	4
LUDHIANA				
1.	Structural Cranes ..	Northern Engg. Co.	—	—
2.	Do.	R. K. Machine Co.	—	—
3.	Do.	Punjab Machinery Works	—	—
4.	Machine Tools ..	Pearl Mech. Engineering Co.	—	—
5.	Power Driven Pumps ..	R. N. Gupta & Co.	—	—
6.	Structural Cranes ..	Amzar Electrical & Mech. Co.	—	—
BATALA				
1.	Power Driven Pumps ..	Khalsa Foundry Co.	—	—
2.	Structural Cranes ..	Batala Engineering Works	3	3
PHAGWARA				
1.	Sugar Mill Machinery ..	M/s. Viday Steel & General Mills	3	3
SONEPAT				
1.	Agricultural Tractors ..	Bawa Iron & Steel Works	4	4
2.	Structural Cranes ..	Do.	4	4
JULLUNDUR				
1.	Boiler Machinery ..	Leader Engineering Works	3	3
2.	Structural Cranes ..	Amichand Pyarelal Co.	3	3
3.	Do.	Indian Structural Works	3	3
4.	Railway Equipment ..	Leader Engineering Works	—	—
YAMUNANAGAR				
1.	Sugar Mill Machinery ..	M/s. India Sugar & General Co.	6	6
2.	Boiler Machinery ..	Do.	4	4
3.	Structural Cranes ..	Do.	—	—

APPENDIX III—*contd.*

1	2	3	4	5
4.	Diesel Engines	Oriental Engg. Works	—	—
5.	Structural Cranes	Do.	—	—
6.	Do.	Roshan Industries Co.	—	—
FARIDABAD				
1.	Structural Cranes	Priestley Duggal Ltd.	3	3
2.	Agriculture Tractors	Eicher Tractor Corporation	4	4
3.	Do.	Indian Landsberg Corporation	5	5
4.	Desel Engines	Lakshminathan Engineering Works	—	—
5.	Do.	Goodearth Manufacturing Corporation	3	3
6.	Printing Machinery	Printers House Co.	4	4
7.	Building and Road Construction	Bhai Sunder Das & Sardar Singh Co.	3	3
8.	Do.	Lakshminathan Engg. Works	—	—
9.	Structural Cranes	Modern Engineering Ltd.	—	—
10.	Do.	Vinod Industries Ltd.	3	3
11.	Do.	Indian Hardware Industries Ltd.	3	3
12.	Cable & Wires	Skytime Electricals Ltd.	3	3
13.	Winding Wires	Hindustan Wire Products Ltd.	4	4
14.	Electric Motor	Hindustan Electric Co.	—	—
15.	Switchgear & Control Gear	Do.	6	6
CHANDIGARH				
1.	Paper-making Plant and Machinery.	Bharat Machine Wire & Co.	4	4
2.	Do.	Jagdish Lall & Sons Co.	3	3
DELHI				
1.	Steel Structural Cranes	Bhai Sunder Das Co.	4	4
2.	Do.	Hindustan General Industries	4	4
3.	Do.	Structural Fabricators Co.	3	3
4.	Do.	Kamel N. Khanna Co.	3	3
5.	Do.	Indus Engg. Co.	3	3
6.	Chemical Plants	D.C.M. Chemical Works	3	3
7.	Power Driven Pump	Raj Electrical	—	—
8.	Structural Cranes	Madan Engg. Tool Co.	—	—
9.	Do.	K. G. Khosla & Co.	—	—
10.	Air & Gas Compressors	Do.	—	—
11.	Cables and Wires	M/s. Reliable Electric Co.	—	—
12.	Do.	Bhagwandas Babu Ram Co.	—	—
13.	Do.	Delton Cable Co.	3	3
14.	Do.	National Conductors Co.	3	3
15.	Electric Motors	India Electric Tools	14	14
16.	Switchgear & Control Gear	Himayatn Exporters	8	8
MADRAS				
1.	Sugar Mill Machinery	Binny's Engg. Works	6	6
2.	Do.	K. C. P. Ltd.	6	6
3.	Do.	Chitram & Co.	3	3
4.	Cement Mill Machinery	K. C. P. Ltd.	6	6

APPENDIX III—contd.

1	2	3	4	5
5.	Boiler Machinery	K. C. P. Ltd.	3	3
6.	Structural Cranes	Southern Structural Co.	4	4
7.	Do.	Binny's Engineering Works	3	3
8.	Do.	General Supdt.	3	3
9.	Do.	Enfield India Co.	3	3
10.	Do.	Jeewan Lal Co.	3	3
11.	Do.	P.S.N.S. Ambalannana	3	3
12.	Do.	Indian Commerce & Industries	3	3
13.	Do.	Binny & Co.	3	3
14.	Agricultural Tractor	Tractor & Farm Equipment Ltd.	4	4
15.	Earthmoving Machinery & Equipment	Limac Ltd.	140	140
16.	Road Rollers	Garlick & Co.	4	4
17.	Chemical Plants	K. C. P. Ltd.	4	4
18.	Do.	South India Export Co.	3	3
19.	Power Driven Pumps	Adoison & Co.	—	—
20.	Do.	Best & Co.	—	—
21.	Do.	Chandra Foundry	—	—
22.	Do.	Industrial & Agriculture Engineering Co.	—	—
23.	Diesel Engines	Ashok Leyland Ltd.	3	3
24.	Structural Cranes	K. C. P. Ltd.	5	5
25.	Do.	V. D. Swami Co.	5	5
26.	Railway Equipment	M/s. Southern Structurals Co.	—	—
27.	Elevators & Conveyors	Chitram & Co.	4	4
28.	Industrial Goods Lifts	M/s. Best & Co.	—	—
29.	Cables & Wires	Madras Cables Co.	4	4
30.	Do.	Omega Insulated Cable Co.	3	3
31.	Do.	K. R. Kothandaraman Co.	3	3
32.	Do.	Premier Cable Co.	3	3
33.	Paper Insulated Power Cables	K. R. Kothandaraman Co.	3	3
34.	Cable & Wires	M/s. Kothari & Sons Co.	4	4
35.	Electric Motors	Best & Co.	—	—
36.	Do.	P. Govindraj Co.	—	—
37.	Do.	Southern Industrial Corporation	8	8
38.	Do.	Argus Engg. Co.	8	8
39.	Transformers	Hackbridge—Hewitric Co.	6	6
40.	Do.	Radio & Electrical Co.	—	—
41.	Do.	Transformer & Switchgear Co.	6	6
42.	Switchgear & Control Gear ..	Radio Electrical Co.	4	4
43.	Do.	Transformer & Switchgear Co.	3	3
44.	Do.	Easun Engg. Co.	3	3
45.	Do.	English Electric Co.	—	—
46.	Do.	Hivlen Industries Ltd.	—	—
47.	Do.	P. Natesan Pvt. Ltd.	—	—
48.	Do.	Pioneer Electrical Manufacturing Co.	4	4
49.	Do.	Blue Mount Switchgear Co.	4	4
COIMBATORE				
1.	Structural Cranes	Everest Engg. Works	3	3
2.	Do.	Nirmala Engg. Works	3	3

APPENDIX III—contd.

1	2	3	4	5
3.	Power Driven Pumps ..	.. Dandavuthpani Foundry Ltd.	—	—
4.	Do.	Karthekeya Foundry	—	—
5.	Do.	Lakshmi Foundry	—	—
6.	Do.	P. S. G. & Sons Co.	—	—
7.	Do.	Ramakrishna Mission Vidyalaya Co.	—	—
8.	Do.	Ramakrishna Industries Co.	—	—
9.	Do.	Subbiah Foundry	—	—
10.	Do.	Bala Subramanya Foundry	—	—
11.	Do.	Coimbatore Premier Corporation	—	—
12.	Do.	Goverdhana Engineering Co.	—	—
13.	Do.	General Engineering Co.	3	3
14.	Do.	Southern Engg. Industries	3	3
15.	Do.	Shri Ram Industries Co.	3	3
16.	Do.	Krishna Foundry	3	3
17.	Diesel Engines ..	.. Textool Co.	3	3
18.	Do.	General Engineering Co.	—	—
19.	Do.	Dandayuthpani Foundry Ltd.	—	—
20.	Printing Machinery	.. Ramakrishna Machinery Corporation.	10	10
21.	Machine Tools ..	.. Abboi Machine Tools Co.	—	—
22.	Structural Cranes ..	.. Textool Co.	6	6
23.	Do.	Ramakrishna Industries Co.	6	6
24.	Do.	Engg. Industrial Foundry	—	—
25.	Do.	Ramakrishna Mission Co.	—	—
26.	Do.	P. R. Ramakrishna Co.	10	10
27.	Air & Gas Compressors	.. Engineering Equipment Co.	12	12
28.	Electric Motors ..	.. Eastern Electrical Co.	—	—
29.	Do.	Jaya Chandar Premier	—	—
30.	Do.	M/s. Coimbatore Premier Corporation.	—	—
31.	Do.	.. Vijaya Foundry Ltd.	—	—
32.	Do.	Kasturi Engg. Ltd.	—	—
33.	Do.	Broadway Engineering & Transport Co.	—	—
34.	Do.	P. S. G. & Sons Co.	—	—
35.	Do.	Texmaco Industries Co.	—	—
36.	Do.	Karthikeya Co.	—	—
37.	Do.	Krishna Foundry	—	—
38.	Do.	Laxmi Foundry	—	—
39.	Do.	Balasubramaniam Co.	3	3
40.	Do.	Ram Krishan Metal Alloy Co.	3	3
41.	Do.	Dhandayuthapani Co.	6	6
42.	Do.	Southern Engg. Industries Co.	3	3
43.	Do.	Goverdhana Engineering Co.	3	3
44.	Do.	Navmani & Co.	3	3
45.	Do.	General Engineering Co.	3	3
46.	Industrial Fans & Blowers	.. P. S. G. & Sons Co.	—	—
		BELGHARIA		
1.	Sugar Mill Machinery ..	.. Texmaco Co.	6	6
2.	Boiler Machinery ..	.. Do.	6	6

APPENDIX III—contd.

1	2	3	4	5
3.	Structural Cranes	Textile Machinery Co.	3	3
4.	Railway Wagon.. ..	Do.	—	—
SAHARANPUR				
1.	Sugar Mill Machinery	Saharanpur Engineering Works	3	3
2.	Structural Cranes	R. B. L. Tirath Ram Co.	3	3
LUCKNOW				
1.	Sugar Mill Machinery	Ganesh Das Ram Gopal and Sons Co.	3	3
2.	Structural Cranes	Ganesh Dass & Sons Co.	3	3
3.	Do.	Indian Light Ganga Co.	3	3
GHAZIABAD				
1.	Power Driven Pumps	Hindustan Industrial Corporation.	—	—
2.	Diesel Engines	Punjab Oil Expeller Co.	—	—
3.	Do.	Guru Nanak Engineering Co.	—	—
4.	Do.	Machines & Spares Ltd.	—	—
MEERUT				
1.	Power Driven Pumps	Datta Engineering Works	—	—
2.	Diesel Engines	Modern Industries Co.	—	—
KANPUR				
1.	Structural Cranes	Charan Structural Harrisganj Co.	3	3
2.	Do.	E. M. C. Works	3	3
3.	Do.	Radheyilal Steel Rolling Mills	3	3
ALLAHABAD				
1.	Sugar Mill Machinery	Triweni Engineering Works	6	6
2.	Air & Gas Compressors	Do.	3	3
3.	Switchgear & Control Gear Industry	General Electrical Co.	6	6
AHMEDABAD				
1.	Structural Cranes	Hind Laboratories	3	3
2.	Do.	Ahmedabad General Engineering Works.	3	3
3.	Chemical Plants	Hind Laboratories	—	—
4.	Do.	Ahmedabad Victoria Iron Works Ltd.	3	3
5.	Power Driven Pumps	Forge & Blower Co.	4	4
6.	Do.	Modern Engg. & Moulding Co.	—	—
7.	Diesel Engine	Do.	—	—
8.	Machine Tools	Machinery & Equipment Manufacturing	—	—
9.	Electric Motors	Modern Engineering Co.	3	3
10.	Switchgear & Control Gear Industries	Electric Controlgear Co.	12	12
11.	Industrial Fans & Blowers	Forge & Blower Co.	—	—

APPENDIX III—*contd.*

1	2	3	4	5
BARODA				
1.	Chemical Plants	Sakta Engineering Works	3	3
2.	Do.	Sarabhai Chemicals Co.	3	3
3.	Do.	Jyoti Ltd.	3	3
4.	Power Driven Pumps	Do.	—	—
5.	Do.	Tractors & Bulldozers	3	3
6.	Buildings & Road Construc- tion Machinery	Do.	—	—
7.	Do.	Sayaji Iron & Engg. Co.	—	—
8.	Electric Motors	Jyoti Ltd.	6	6
9.	Do.	Vasant Engg. Ltd.	3	3
10.	Switchgear & Control Gear	Hindustan Electric Co.	4	4
BANGALORE				
1.	Structural Cranes	Steel Construction Co.	3	3
2.	Chemical Plant	Do.	3	3
3.	Electric Motors	M/s Kirloskar Elec. Co.	—	—
4.	Do.	Govt. Electric Factory	—	—
MYSORE				
1.	Cables & Wires	Radio & Elect. Mfg. Co.	—	—
2.	Winding Wires	Bharat Insulations Ltd.	3	3
3.	Transformers	Govt. Elect. Factory	—	—
4.	Do.	Kirloskar Elect. Co.	—	—
5.	Switchgear & Control Generator	Do.	6	6
6.	Do.	Mysore Electricals Ltd.	8	8
DURGAPUR				
1.	Cement Mill Industry	AVE ilaco Hansa	12	12
2.	Boiler Machinery	Do.	12	12
3.	Coal Mining Machinery	A.C.C. Vicker	9	9
4.	Rly. Equipment	Flag India Co.	30	30
SAHABAD (MYSORE)				
1.	Cement Mill Machinery	Associated Cement Co.	12	12
BAREILLY				
1.	Sugar Mill Machinery	R. R. Engineering Co.	3	3
INDORE				
1.	Sugar Mill Machinery	Rajkumar Mills Co.	3	3
PIMPRI				
1.	Sugar Mill Machinery	M/s New India Development Co.	6	6
2.	Structural Cranes	Mohindra Oven Ltd.	3	3
MUZZAFFARPUR				
1.	Sugar Mill Machinery	Arthur Butler & Co.	3	3
2.	Wagons	Do.	—	—
24-PARGANAS				
1.	Paper making Plant & Machinery	Berry Brother Co.	3	3
2.	Jute Mill Machinery	Anglo India Jute Mill Co.	—	—

APPENDIX III—concl'd.

1	2	3	4	5
3.	Steel Structural Cranes	.. Textile Machinery	3	3
4.	Do.	Modern India Construction	3	3

The following is the location of some of the other major industries :

Iron & Steel Industry :

Bhilai
Rourkela
Durgapur
Mysore Iron & Steel Works
Bokaro
Private sector (Tata Iron & Indian Iron)

Alloy Tool and Special Steel :

Durgapur Plant
Ordnance Factory, Kanpur
Ordnance Factory, Ichhapur
Private Industry

Grey Iron Castings, Steel Castings and Steel Forging :

Forge and Foundry, Ranchi
Durgapur Mining Machinery Plant
Hindustan Machine Tools, Bangalore
Durgapur, Bhilai, Rourkela
Chittaranjan Loco
Foundries attached to Railway Workshops

Aluminium :

Indian Aluminium Company's Plant, Hirakud
Indian Aluminium Company's Plant, Alwaye
Smelter at Rihand
Smelter at Koyna
Smelter at Salem
Aluminium Corporation of India

Copper :

Khetri and Derebo Copper Mines

Zinc :

Zawar Mines, Rajasthan

Chemical Industries :

Existing capacity (Sindri, Nangal, FACT)
Rourkela
Neyveli
Trombay
Nahorkatiya
Further expansion of FACT
Gorakhpur
One more fertiliser company in the public sector
Sahu Chemicals
Ennore, Madras
Madhya Pradesh
Visakhapatnam
Kothagudem
Rajasthan
West Bengal

APPENDIX IV

Copy of the d.o. letter No. F. 10-15/60-T.2, dated 18th September, 1962 from Dr. A. Ramaswami Mudaliar, Chairman, Committee for Assessment of Management Personnel addressed to various Commercial Firms

The All India Board of Technical Studies in Management has set up a Committee under my Chairmanship to assess the requirements of management personnel for the country's development programme in the private and public sectors. The need for post-graduate professional education in management subjects was recognised by the Board sometime ago and it has organised two courses viz. (i) course of study in Business Management and (ii) course of study in Industrial Management, in a few selected institutions. The course in Business Management is open to persons working in Commercial houses or Industrial establishments who are graduates and who have a minimum of two years requisite experience. Under the scheme prepared by the Board, there is a common Intermediate examination in the following subjects :—

1. Growth & Structure of Industry & Commerce
2. Economic Aspects of Industry & Commerce
3. Legal Aspects of Industry & Commerce
4. Psychology
5. Financial Accounting & Evaluation
6. Statistical Method
7. Work Study, Organisation & Evaluation
8. History & Nature of Management

The subjects for the final examination (in Business Management) are as follows :—

1. Management Principles
2. Management Practice
3. The Personnel Function
4. Financial & Higher Control
5. Purchasing, Storekeeping and Transportation
6. Sales Organisation & Methods
7. Market Research & Sales Promotion
8. International Trade.

These courses are at present organised on a part-time basis. Facilities for instruction in these courses are available at the following centres :—

1. Delhi University
2. Bombay University
3. Madras University
4. All India Institute of Social Welfare and Business Management, Calcutta

The All India Council for Technical Education, under the recommendation of the Board has also approved the organisation of these courses in the following centres :—

1. Gujarat University
2. Madurai
3. Lucknow University
4. Allahabad University

Government of India are also setting up two institutions of Management—one at Calcutta and the other at Ahmedabad, which will provide courses leading to the award of degrees in Management subjects.

The purpose of the enquiry is to assess the requirements of managerial personnel who may be trained in theory and practice of management with a view to determine the extent of facilities that should be organised in the country for the training of such personnel. To enable this to be done, it is necessary to have information about the existing managerial personnel in the following fields of management :—

- (1) Purchasing Management.
- (2) Sales Management.
- (3) Organisation Management.

The Purchase functions comprise study of Markets, Supplies, Prices, Government Regulations, Standardisation and Specifications. The Sales functions comprise Sales Administration, Sales Negotiations, Internal Sales, Foreign Sales, Government Sales and Marketing. Organisation Management covers in general the following fields :—

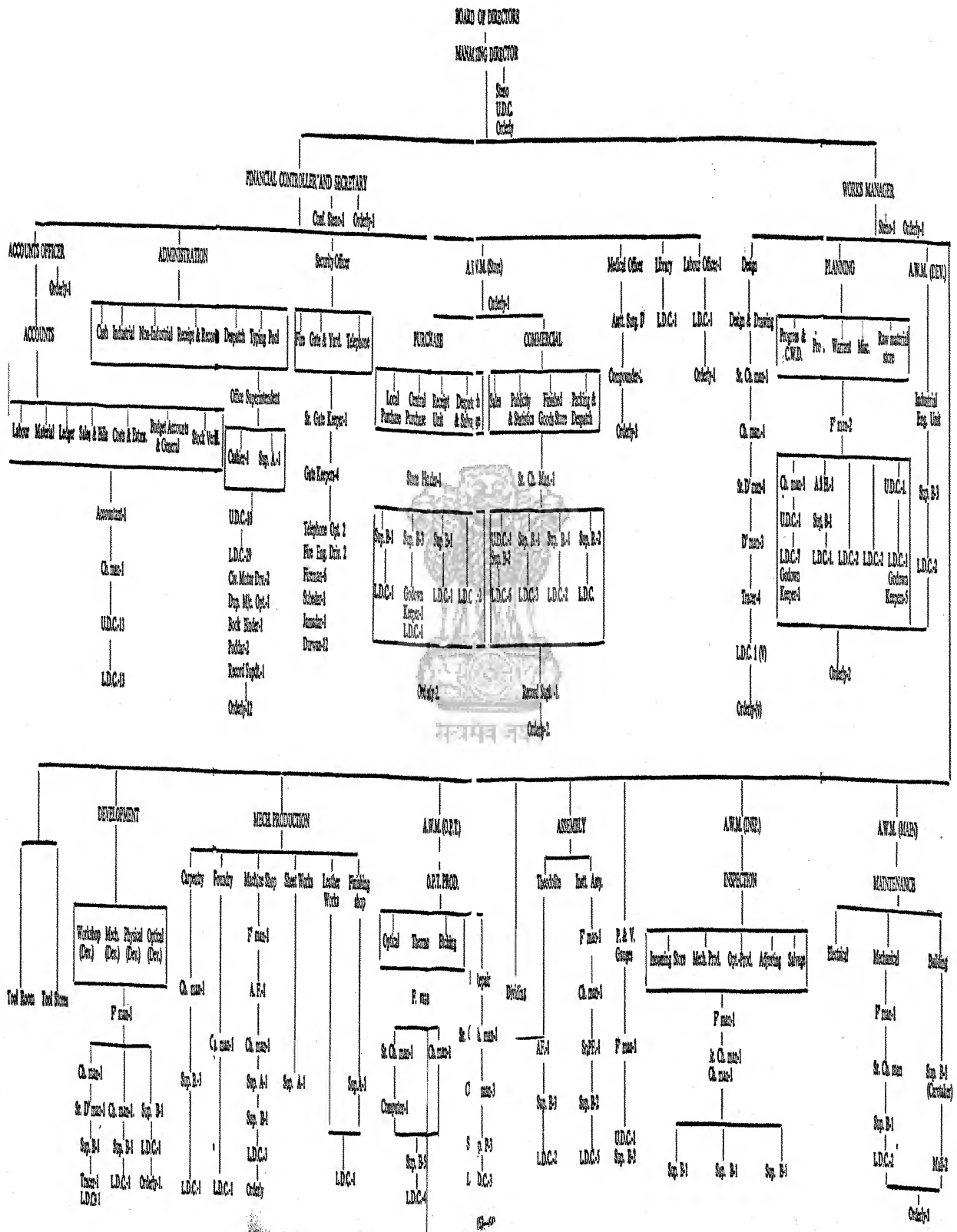
- (a) Cash Management
- (b) Credit Management
- (c) Budgeting
- (d) Taxes
- (e) Export Promotion
- (f) Government Relations
- (g) Public Relations
- (h) Advertising
- (i) Contracts
- (j) Transport (Railways wagons internal and shipping space external).

It would be of immeasurable value to the Committee if you would be so good to kindly complete the questionnaire, and forward the same to the Secretary of the Committee, Shri M. V. D. Nair, Assistant Educational Adviser, Ministry of Scientific Research & Cultural Affairs, New Delhi at your earliest convenience.

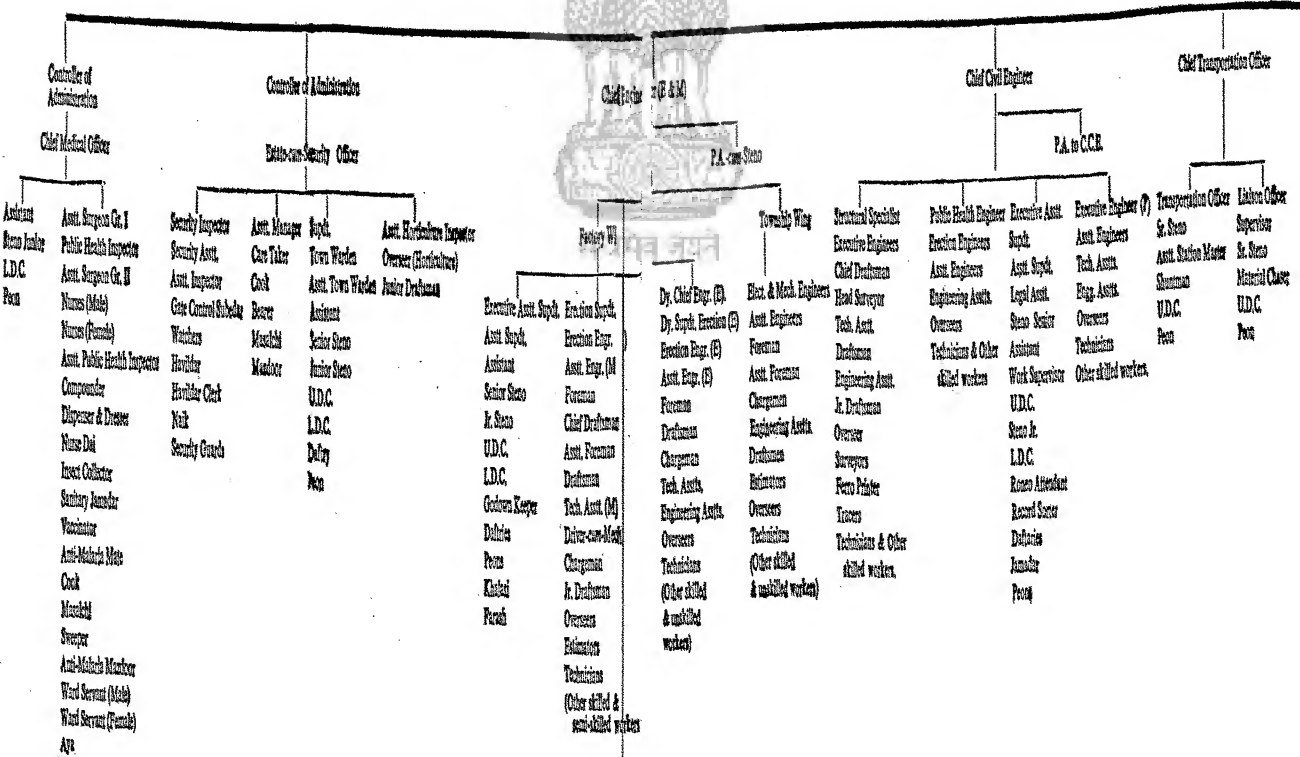
QUESTIONNAIRE

1. Name of the concern
 2. Total annual gross value of business for the years 1960-61
 3. No. of persons employed in the following categories :—
 - (a) Purchase Management
 - (b) Sales Management
 - (c) Organisation Management
 - (d) Personnel Management
 - (e) Combination of more than one of the above categories.
 4. What are the qualifications and experience prescribed for executive personnel in the above four categories.
 5. No. of persons at present in service for whom training facilities in Business Management may be required.
 6. No. of personnel trained in Business Management required during the third Plan period to provide for (a) normal retirement requirements (b) to provide for expansion of the existing establishment.
 7. Location of additional centres which in your view should provide training facilities in Business Management.
-

II. Staff Chart of National Instruments (Private) Ltd.



RECTOR



APPENDIX VI

Post-Graduate Course in Industrial Engineering

Syllabus of Studies Approved by the Board of Technical Studies in Management

Subject	Study Hours	Examination	
		Duration	Mark
PART—I			
1. Structure & Economic Aspects of Industry & Commerce	50	3 hours	100
2. Personnel Management and Industrial Relations	100	3 ..	100
3. Management Principles and Practice	100	3 ..	100
4. Procurement & Inventory Control	25	2 ..	50
PART—II			
1. Work Study	50	3 ..	100
2. Materials Handling	25	2 ..	50
3. Statistical Methods and Statistical Quality Control	75	3 ..	100
4. Location of Industry & Plant Layout	50	3 ..	100
PART—III			
1. Production, Planning & Control	50	3 ..	100
2. Cost Control	50	3 ..	100
3. Quality Control & Metrology	50	3 ..	100
4. Operational Research	25	2 ..	50
5. Maintenance	25	2 ..	50
6. Job Evaluation & Merit Rating	50	3 ..	100
7. Project Work & Report (Instruction & Contact hours)	50	3 ..	100
Post-Institutional Project Work—Duration 3 months			
Project	—	—	100
Viva	—	—	50

SYLLABUS

Part I

1. Structure and Economic Aspects of Commerce and Industry

1. Nature and significance of economic science—economics and technology—utility of economics in business management and industrial engineering.
2. The Economic Flow Chart—the various stages of conversion and changes in value in manufacturing, agriculture, mining, construction, transportation, utilities and trade.
3. Importance of concepts—analysis of demand and supply—law of diminishing utility—concept of elasticity of supply and demand—importance of marginal principle in economic action—laws of costs—importance of increasing returns in industrial activity—forces governing the supply of factors of production—land, labour and capital and ownership.
4. Theory of the firm under static and dynamic conditions—The problem of price fixation—The role of supply and demand—Concept of rent and quasi-rent—Equilibrium analysis, partial and general—Concept of normal profits—The representative firm—Price fixation under conditions of monopoly—Oligopoly and bilateral monopoly.

5. Theory of distribution—The principle of substitution and marginal productivity theory—Effects of economic institutions on distribution—Trade unions and wage rates—Distribution and economic progress.

6. Methods of obtaining finance—Internal and outside sources—Industrial Financing Institutions—The problem of working capital ; Relationship of the business units with banks.

7. The external influences affecting an enterprise ; national income ; national output ; income distribution ; savings and capital ; money rates ; stock market prices ; long-term and short-term economic changes.

8. Size and location of industries.

9. Money—Present worth ; sinking fund deposits ; capital recovery equivalence interest as an item of cost.

10. Depreciation—causes, definitions and significance of depreciation in industrial production ; the straight-line method, the sinking fund method and the diminishing balance method of accounting for depreciation ; book value of a depreciated asset ; probable useful life of industrial property ; industrial property mortality curves and statistical means of determining lives of assets.

11. Unit cost characteristics—theory of units costs and total costs ; the cost to possess, the cost of service and the hourly burden ; the cost of operation and maintenance ; cost per unit of output in relation to the volume of production ; the break-even chart, sales expense, relationships ; the profit and loss chart for companies and industries.

13. Relative worth of alternatives—determination of the relative worths of several competing propositions ; Kelvin's law and its application ; minimum cost formulae and their applications.

14. Quantitative assessment of the performance of companies and industries.

Part I

2. Personnel Management and Industrial Relations

Personnel management—background, need for an importance of formal personnel administration ; basic functions and place in the organisation ; qualitative and quantitative aspects of manpower ; job analysis, job descriptions and job specifications ; employment activities—sources of recruitment, interviewing tests and examinations, selection, placement, induction and follow-up ; personnel ; training and education ; training of operatives ; supervisors and executives ; T. W. I., statutory provision labour turnover promotions and transfers.

Industrial Psychology—individual difference ; definitions and terminology in testing ; mental ability ; mechanical comprehension dexterity, manipulation, achievement, personality, interest and aptitude tests ; training of employees and learning curves ; work, fatigue and efficiency ; Hawthorne investigations ; incentives ; attitudes and moral ; Employee development—mental, physical, moral, social, emotional, vocational and avocational.

Industrial Relations—determinants of industrial relations—unions, employers, Governments and managements—their functions and obligations ; organised labour in India—Principal unions, their history, growth and structure ; Labour management consultation ; a brief survey of the growth of trade unionism in the U.S.A., and in the U.K. ; typical labour agreements and their provisions—wages, hours and working conditions ; grievance procedure ; collective bargaining ; strikes and lockouts ; conciliation and arbitration of disputes ; tribunals and industrial courts.

Industrial health and safety—accident and health hazards in industry ; accident records ; severity and frequency of accidents ; organisation for safety ; the Safety Committee ; safety education and accident prevention programmes ; workmen's compensation ; lighting, ventilation, humidity, air conditioning, noise, vibration, sanitation, disposal of industrial wastes and health services ; Insurance plans and Statutory provisions ; the economic, technical and human aspects of industrial safety and health.

Industrial and labour laws and their administration.

Elementary discussions on the activities of the Ministry of Labour, the Central Labour Institute, the I.L.O. and its covenants, problems of industrial labour, elderly workers, women workers, rationalisation and employment opportunities.

Part I

3. Management Principles & Practice

A—Management Thoughts

1. Evolution of 'management' thought and of the principles and methods of scientific management—Impact of empirical studies on the development of 'management' thought—Contribution by leading authorities ; the current trends in 'management' thought.
2. Training for management : Value of theory and experience and interdependence of the two—Social purpose in history—Status of the individual and the human element . Problem yet unsolved.

B—Nature and Functions of Management

3. Preliminary : The need for precision in terminology (*e.g.* the term 'management' to be confined to function rather than status). The art of directing human activities. Responsibilities of management to different social groups—Application of scientific methods to managerial problems—inductive thinking—The importance of standards Responsibilities of Management—to customers, to consumers, to the community, to employees, to the owners and to management itself as a profession ; growth of management as a profession as distinct from ownership ; management as a Science, an Art and a profession. Managing the business, the managers, the work and workers. The objectives of management.
4. Elements of Management—Planning, Organising, Co-ordinating, Motivating and Controlling.
5. General principles of organization and management—functionalisation ; line and staff and lateral relationship ; authority and responsibility ; chain of command ; span of control ; the exception principle ; principles and duties of management.
6. Responsibilities of the various levels of management—the board of directors, the chief executive, the functional heads, senior and junior executives and supervisors ; determining, defining and directing executives ; supervisory responsibilities ; establishing the organisational structure ; organisation charts and manuals.
7. Relation of functional and sectional policies to general policies ; issue of instructions and the means of communication ; ensuring co-ordination through committees and reports ; presentation ; control of information.
8. External relationships of an organisation—public relations ; trade associations, trade unions, Government agencies, civic and local authorities ; technical and professional associations, etc.
9. The Management Movement—growth of management associations in the U.S.A., the U.K. and other countries ; situation in India ; education and training for management abroad and in India ; the international organisation for management ; the qualities and attainments of a manager ; the specialist vs. the generalist as a manager ; executive development programmes.

Part I

4. Procurement and inventory control purchasing

The Purchasing Function

The Purchasing Officer—Qualifications—Purchasing ; Its place in management—Purchasing and development and design—Purchasing and production—Purchasing and accounts—Purchasing and costing—Purchasing and sales—Management and purchasing—Purchasing department organisation—Centralisation and decentralisation—Location of department—Department layout.

Basic Economic Principles

Buying the right quality—Quality by brand—Quality by sample—Quality by market grade—Quality by standards—Quality by specification—The right quantity—Cost of placing

an order—Cost of handling and holding stock—Quantity discounts—Stock levels and ordering quantities—How much to buy at a time—Open market purchases—Special purchases—Supply and demand—Buyer's and seller's markets—Market price and timing—Competitive buying—Sources of supply.

Purchasing Policies

Budgetary control—Unit production cost—Finance and purchasing policy—Inventory investment—Purchasing and price trends—Specific buying policies—Speculative purchasing—Buying policy for various types of commodity—Make or buy—Determination of policy—Scope of self-manufacture—Purchase through dealers—Personal purchase for employees—Policy and purchasing ethics—Dealing with suppliers—Principles and standards.

Purchasing Procedure

Outline—Purchase requisition—Selecting the supplier—The enquiry form—Comparing the quotations—The quotation record—The purchase order—Acceptance of the order—The contract note—Alteration or cancellation—Progressing delivery—The delivery date—Progressing methods—The delivery follow-up department—Importance of efficient progressing—The advice note—Notice to goods-receiving department—Receiving goods—The tools received note—Goods-receiving procedure—Rejection of goods—Notification to carrier—Divergence of receiving practice—Inspection for quality—Containers—Payment—Certification of invoices—Handling invoices—Cash discounts—Trade discounts—Quantity discounts—Cumulative discounts and rebates—Loyalty rebates, Summary—Conclusion.

Forms and Records

Introduction—Designing a form—Purchase forms—Purchase requisition—Enquiry form—Purchase order—Amendment to purchase order—Specification sheets—Conditions of purchase—Goods received note—Purchasing records—Catalogues ; Filing—Catalogues Indexing—Charts—Contract record—Delivery record—Departmental code—Drawing register—Follow-up record—Inspection reports—Material classification code—Material specification record—Order register—Purchasing record—Price record—Quotation analysis; record—Foreign Import Licence and Customs Formalities.

Construction Schemes

Scope—Basis of contracts, price or lump sum, schedules of prices, reimbursement of actual cost plus a fee—Standard forms of agreements—Professional relationships, architects, quantity surveyor, engineer—Subcontractors—specialist Sub-contractor—Price variation—Variations in requirements—Delays—Injury and damage—Labour—Payment—Demolition utility supplies, etc.

Purchasing Research

Definition—Purchasing research activities, spending less on materials, reducing product cost, cost of the supply operation, meeting production or service needs, planning for the future—value analysis, standardisation, substitution, assessing relative value—sphere of influence—Obvious advantages—Unstable commodity prices—Practical problems in securing safety of supply.

Inventory Control

Methods of control, Maxima and Minima, order Levels, Inventory Theories.

Storekeeping as a security and service function. Kinds of stores ; raw materials ; component parts (and work-in-progress) general supplies ; finished products ; tools and plant Arrangement and equipment of storage accommodation to suit each. Safeguarding against theft, misplacement, damage by fire or water, depredations by pests, deterioration through atmospheric conditions. The layout of stores in relation to easy location and access to articles ; systems of designing bins and storage space. Controls and checks over receipts and issues ; the importance of written authorisation. Forms and procedures. Receiving goods from outside ; check of quality of description ; arrangements for inspection of quality ; deviations from specification. Receiving articles produced in works ; returns of surplus materials. Issue of materials and components ; ensuring promptness and accuracy. Maintaining records of all transactions. Periodical stock check of every item ; perpetual inventory or annual stock-taking. Relationship with Stock control and Accounting functions.

Warehousing finished goods. Packing ; types of packages and containers ; suitability or different products and modes of despatch.

Part II

1. Work Study

Work study—definitions and terminology ; field of work study.

Methods Improvement—purpose and objectives ; brief history and growth of tools and techniques ; procedure in a methods improvement programme ; principles of motion economy pertaining to the movements of human body and its parts, work place layout and design of tools and equipment ; tools and techniques used in methods improvement—process chart symbols, process charts for operator of material, process charts for units with more than one component, flow diagram, two-handed charts and multiple activity charts ; operation analysis questionnaires for materials, materials handling, tools, jigs and fixtures, machine set-up and operation, the operator, working conditions and inspection requirements ; use of motion picture films in motion analysis ; SIMO charts ; chronocycle-graphy ; developing improved methods ; presentation, installation and maintenance of the improved method.

Predetermined Motion Time Standards ; Works Measurement (Time study) aims and objectives ; uses of time study data ; origin and development ; time study terminology and tools ; use of the stopwatch ; the procedure in making a time study ; breaking up the operation into elements ; selection of operators ; measuring and recording time study data ; forms used ; handling foreign elements ; objective and subjective rating and levelling ; allowances—personal, delays, fatigue and others ; analysis and calculations, shortcut timing methods ; production ratio delay and other special purpose studies ; synthetic and standard data methods ; handling and setting times, idle times, process allowance, etc., timing group operations ; use of time study data for wage incentives ; special timing devices and equipment ; application of time study to typical production operations ; role of incentives and their limitations in increasing productivity, financial and non-financial incentives ; human factors involved ; types of incentive plans ; group plans ; plans for indirect workers.

Discussion on introducing work study and wage incentives into an organisation ; criticisms on time study and incentives ; training of personnel in work study and incentive applications ; the time study engineer, present-day problems in India in increasing productivity through work study and wage incentives.

Part II

2. Materials Handling

Materials handling, its importance in increasing productivity and effecting savings Selection of materials—handling equipment, annual cost analysis ; its application, co-ordination ; Effect of materials handling on plant layout in industrial situations, to the processes and operations of the factory in saving working area, and in reducing the unit cost of production. Consideration of the simpler non-mechanised handling methods ; Pallets and stillages, hand trucks, hand traversing mono-rail conveyors, belt conveyors, roller conveyor, moving platforms, overhead runway conveyors, Scraper conveyors, bucket elevators, pneumatic conveyors, fork lift truck, Straddle Trucks, mobile cranes, overhead cranes, electric cranes. Handling bulk materials in tipping trucks & shovels, filling wagons and lorries from elevated hoppers by portable elevators and dumpers, wagon tippers, removable bulk containers. A few case problems will be highly desirable.

Part II

3. Statistical methods and Statistical Quality Control

1. Importance of use of statistical techniques in business administration.
2. Collection and presentation of data—Sources of economic statistics in India—Their methods of collection, accuracy and coverage—Statistical organization as set up at the Centre and in the States.
3. Permutations, combinations, elementary theory of probability, mathematical expectation law of large numbers, central limit theorem.
(Without proof—applications and importance only)
4. The design and preparation of a statistical report.

5. Standard statistical techniques for analysis and interpretation of data. Standard Distributions—Binomial, Poisson, Normal and Hypergeometric, large sample tests—Exact sample tests—Students' t , F , Chi Square, Correlation, Regression, Association and Contingency.

6. Methods of forecasting—Analysis of time-series.

7. Use of Sample surveys and design of experiments.

Statistical Quality Control

Importance of Statistical Methods in Quality Control—Frequency Distributions and Applications—Probability—Normal Distribution.

Control Charts for Variables, for fraction defective and for defects—Theory of Runs.

Sampling Inspection—Acceptance Procedures—Single, Double, Multiple and Sequential Sampling Inspection Plans—Use of Dodge Roming and other statistical sampling Inspection Tables.

Special Statistical Methods—Tests of Significance—Analysis of variance—Design of Experiments—Correlation Theory of Goodness of Fit.

Quality audit—Measuring and controlling effectiveness of quality control.

Part II

4. Location of Industry & Plant Layout

Plant location—major factors influencing the location of an industry and choice of site ; the big city and small town plant location ; localisation of industries ; social and governmental factors in plant location ; decentralization of industries and regional self-sufficiency ; industrial housing ; discussion on the location of some major new plants in India.

Plant layout—factors influencing plant layout ; balance in departments and operations ; production or work centres and the work-place layout ; product or line layout ; layout by process of functions ; work in process banks ; service centres, tools and techniques used in making layouts—flow diagrams, process charts, machine layout data cards, visual aids such as templates and three-dimensional models, layout drawings and plot plan or model plant ; illustrative examples of representative plants in selected industries ; factors indicating poor layout ; means of securing more floor space.

Plant buildings and Services—sizes and types of factory buildings and their construction ; latest trends in factory buildings and industrial architecture ; building costs of alternative types ; scope for expansion ; lighting ; power ventilation ; air-conditioning ; dust removal ; water ; steam ; compressed air ; gas ; industrial waste disposal.

Part II

5. Product Design & Development

Research and its relation to development and design. Types of research ; Fundamental, applied and development ; their relative nearness to the objectives of industry and commerce. Subjects of research ; raw materials ; processes and machines ; products ; labour ; and markets. Research within the enterprise ; its organisation and personnel. Outside agencies and their use ; Trade Associations ; Department of Scientific Research ; Technological Research Institutions ; The Government Test House, Physical and Chemical Laboratories ; University and Technical Institution Laboratories. Co-operation and co-ordination between industrial enterprises and those bodies. The financing of research.

Development and the application of research. Importance of utilising the results of research for the benefit of the community. The impact of new materials and new processes on established products and on the industries producing them. The need to keep "up with the times" as alternative to regression. Encouraging initiative and new ideas throughout the enterprise. Inventions. Patents ; as a reward to the inventor ; their nature and legal implications. Stages in the development of products and of processes. By-products ; investigation of their commercial potentialities and possible value.

The design function. Organisation and personnel of a design department. The equivalent function in Textile, Chemical and extractive industries. Considerations of utility, serviceability, appearance and style. Consumer preference. Design for production ; considerations of quantity and costs in relation to alternative materials and processes of manufacture ; ease of adjustment and repair ; Use of standard parts and standardised manufacturing operations. Interchangeability of parts ; the specification of quality, the economic balance against costs. Quality control in relation to design.

Part III

1. Production, Planning and Control

Introduction--definitions and terminology in production forecasting ; planning and control ; basic functions ; design installation and operation of a system ; benefits from production planning and control ; types of production and their basic characteristics.

Elements of Planning function--materials and their availability, quality standards machine and equipment capacity tolling, operation analysis, time standards, lot sizes and assignment of due dates ; preplanning activities ; routing and scheduling activities.

Part III

2. Cost Control

Importance of costing and cost control. Sources of cost data.

A brief review of principles of cost accounting, concept of marginal costs, standards and standards costs. (Students must have studied all these while studying Elements of Financial and cost accounting in Part I. (At this stage only recapitulation will be necessary).

2. Control of material costs : responsibility for control ; materials specifications, purchasing, receiving and storage, physical loss, current control technique ; performance against perfection standards ; salvage.

3. Control of labour costs : desirability of standards for direct and indirect labour ; planning the labour force ; performance reports ; variance reports ; productivity indices and control through incentive plans.

4. Control of factory expenses : budgets based on judgements and standards ; fixed and flexible budgets ; monthly budget reports and other reports.

5. Costing bye-products and joint products.

6. Distribution expenses ; recording of distribution expense ; responsibility for distribution expense ; budgetary control of distribution expense ; control of selling expense ; evaluation based on results.

7. Administrative Expense ; recording administrative expenses, administrative expense budgets, research project costs and allocation to product lines.

8. Break-even Analysis :

9. The operating budget and measurement and control of project.

10. Reporting to top management : integrated periodic reports to the chief executive and to board of directors.

11. Measuring the effectiveness of a cost control programme.

Part III

3. Quality control and Metrology

Definition of quality--Meaning of control in Industry--History of quality control--Cost and Benefits of Quality Control.

Organisation for Quality Control--Introduction of Quality Control in the Plant--Benefits to be derived from Quality Control--Relation to other departments, single plant versus multiplant organisations.

Factors in controlling Quality--Jobs of Quality Control--New Design Control--Incoming Material Control--Product Control--and special Process Studies.

Metrology.

Part III

4. Operational Research

Operational Research—Current operation analysis techniques ; use of Mathematical Models, application of methods and cost studies to advanced problems, e.g. Linear programming, Theory of Queues, Theory of Games, etc.

Part III

5. Maintenance

Maintenance & Repairs, its importance in increasing productivity, and ensuring the fullest utilisation of the capital invested in respect of buildings, equipment and plants. Break down schedule, planned and Preventive Maintenance. The organisation of a maintenance and repair department, how it fits in the overall organisation, planning and control of maintenance work, maintenance of log sheet and design of other forms for collecting various information.

Part III

6. Job Evaluation & Merit Rating

Introduction—deficiencies commonly seen in current wage administration plans; field of job evaluation, definitions and terminology ; basis for wages—national minimum rates, industry minimum rates, job minimum rates, wage rates and cost of living, base rates and auxiliaries, special rates, overtime rates and incentives.

Job analysis ; types of job evaluation plans and their relative merits ; the ranking method ; the factor-comparison method ; the point system ; organisation for job evaluation ; job evaluation committee selection of the right plan ; step-by-step procedure in evaluation ; job grades, the job evaluation manual ; wage surveys ; relating points to wage structure ; operation and maintenance of the plan ; appeal procedure ; training for job evaluation.

Merit Rating : Objectives and purposes ; procedure and technique ; methods of rating ; the rating scale and sheet ; weighing individual traits and assigning values ; training of raters ; putting a rating programme into effect.

Part III

7. Project Work and Report (Instruction and Contact hours)

Each student will be required to prepare a comprehensive report covering one or more aspects of a manufacturing unit of his choice in the following lines :

Summary—To be presented in the form of a chart/table indicating all the important features of the proposed project at a glance.

Introduction—Reasons for choosing the project.—a brief survey of the working of similar units in the country and elsewhere in the world, present demand, future demand, government policy, foreign exchange savings, employment potentialities etc ; availability of raw materials ; skilled labour and other facilities ; choice of an economic unit, capital requirements, expected return on the capital investment ; any difficulty envisaged and how it is to be overcome.

Product Engineering—Detailed engineering specifications of the product, detailed processes to be explained by flow diagram and process chart ; time values allotted for each process if possible by operation ; bill of materials—indicating parts to be imported, parts to be obtained through vendors, and parts to be made at the proposed unit.

Production, Planning and Control : Scheduling, material handling programme, inventory control, quality control, manning programme, etc.

Plant Layout—Specification of the various requirements of a suitable site, selection of equipment, layout, buildings and services, a floor plan indicating the important dimensions. The same floor plan may be used to show the flow of materials.

Sales and Sales Policy—Detailed plan after due consideration of various known sales techniques.

Finance and Financial Control—Discussions on various patterns of company financing and capital formation in the light of the existing income-tax policy and the various financial incentives given by the government and the most advantageous one should be recommended for the new unit.

Presentation of a balance sheet as it is expected to be after the operation of the proposed unit for one year

Costing and Cost Control : Choice of a suitable costing system ; presentation of the detailed costing indicating all cost items ; detailed plan for an effective cost control system specially suited for the proposed industry.

Organisation—Presentation of an effective organisation chart, job description, salary recommended, training scheme for employees, line of communication etc.

Master Schedule—Presentation in the form of a chart, with explanatory notes where needed, indicating the target dates for all important activities.

Recommendation—Anything a student likes to make.

Note :—It is important for each student to adhere to a standard form to be prescribed by the institute. Each report should in addition to the above, have a table of contents, list of tables/charts, list of exhibits, an acknowledgement and a bibliography.

It is not advisable to present too much details in the main body of the report. They should be shown in the Appendix.

It will be extremely helpful for a student to put himself as an expert working on the request of an interested financier. No financier will pay for superfluous material nor will he pay for a report which does not give vital information.



सत्यमेव जयते

APPENDIX VII

Part-time Course in Foremanship and Supervision

Syllabus Approved by the All-India Board of Technical Studies in Management

Duration	2 years
Total number of hours of instruction at the rate of 2 hours a day, two days a week for 40 working weeks in a year	320
Subject	No. of hours of instruction
Elements of Supervision	30
Industrial History & Industrial Relations	28
Communications in Industry	38
Elementary Principles of Management	32
Elements of Personnel Management	36
Principles of Foremanship	42
Principles of Production Planning	48
Principles of Remuneration, Estimating and Costing	44
Safety in Industry	22
Total	320

Examinations will be conducted by the institutions which will be free to evolve their own methods of judging the extent to which the candidate has successfully followed the course. It is, however, suggested that a Pass Certificate should only be awarded if the candidate concerned attains a minimum standard in each of the three groups of subjects as given below :

Group A (Background)	Elements of Supervision. Industrial History & Industrial Relations. Communications in Industry.
Group B (Principles)	Elements of Personnel Management. Principles of Foremanship. General Principles of Organisation and Administration.
Group C (Tools)	Safety in Industry. Principles of Production Planning. Principles of Remuneration, Estimating and Costing.

Elements of Supervision 30 hours

Who is a Supervisor ? Transition from Worker to Supervisor. Economic and social changes; New outlook. New responsibilities. The example he sets.

Daily supervision and contacts. Developing relationships. Each individual is different. Job satisfaction. Detecting and eliminating causes of discord. Importance of principles and discipline.

Industrial History & Industrial Relations 28 hours

Place of industry in Indian economy.
Employers' organizations. Workers' organizations.
Professional Associations.

Broad facts about—

Labour Legislation. Indian Factories Act. Payment of Wages Act. Workmen's Compensation. Employee's State Insurance, Provident Fund. Trade Unionism—Collective bargaining. Welfare of workers. International Labour Organization.

Communications in Industry 38 hours

Place of the Foreman in the organization structure. Communications downwards & upwards. The spoken and written word (English). Effectiveness of simple, accurate, brief, and impersonal composition.

Bulletins, House Magazines, Circulars. Plant papers. Suggestion Box Scheme. Radio & Loudspeakers. Giving orders. Listening to grievances. Consultation. Conferences. Leading a group discussion. Report writing ; the problem ; causes, solution, implications.

(The group will be required to do drafting exercises. Communications material produced by different firms will be presented for discussion. Members will practise conference technique).

Elementary principles of Management 32 hours

Growth of Scientific Management. Social aspects of a business. Responsibility to the community, employees and the ownership. Unity at all levels, delegation of authority. Final organisation and organisation charts. Coordination, planning and control ; Motivation and morale.

Elements of Personnel Management 36 hours

Changing circumstances. Understanding men and their needs. Recognised personnel functions.

Employment. Right man for right job. Job specification. Aptitudes. Selection tests and interview. Starting the new employee (Induction & Training). General Welfare amenities. Handling grievances, ensuring uniformity of decisions, discipline, correcting the workers, employee counselling. Absenteeism, labour turnover, interviews. Joint consultation. Works committees.

Principles of Foremanship 42 hours

The potential Foreman. Qualifications and selection. Status of a foreman. First representative of management. Leader and not driver of men. What makes a leader. Developing good job relations.

What Management wants :

Technical ability. An understanding of Company's policy. Sense of responsibility. Ability to get on with people. Personal leadership. Cost consciousness. Ability to plan work. Judgement in decisions. Constructive and independent thinking. Ability to put ideas across.

What workers expect :

To be treated like people. Feeling that they matter. Proper directions. A fair deal. Job security. Chances for advancement.

What matters for higher production :

Creating interest. Matching jobs to ability. Inspiring enthusiasm. Developing teamwork. Building morale. Better methods.

How to improve quality :

Defining responsibility. Developing pride in quality. Training in correct procedures. Studying of causes and errors. Persistent follow-up.

The Foreman as a Trainer.

Present methods not necessarily the best. Analysing present methods. Developing and trying new methods. Training in new methods, various methods of training (T.W.I., case methods, short courses, etc.)

Principles of Production Planning 48 hours

Balance between sales & production. Forecasting. Importance of higher production. Relation between producing and other departments. Functions of Design & Drawing Office.

Flow of work. Department & layout. Factory Material handling and mechanical methods. Material control. Maintenance. Progress and Scheduling. Production Problems. Progress Control Methods. Plant and Tool provision at all stages. Operation Control of Efficiency.

Flow process charts. Movement economy.* Time saving devices. Quality Control. Organisation and Inspection. When, Where and What to inspect. Foreman and the Inspectors.

Principles of Remuneration, Estimating and Costing 44 hours

Methods of Wage Payment. Time Keeping and Pay Roll Compilation. Payment by results. Various methods.

Rate Setting and Estimating. Knowledge of Machine Tools & Processes. Time and Motion Study. Human factor-Relaxation and other allowances. Operation Planning. Foreman and Rate Setters.

Financial aspect of a business. Importance of cost control. The break-even point. Higher production and lower cost. The price structure. Elements of cost -direct & indirect. Job order cost and process cost. Actual or historical cost. Standard cost.

Cost analysis, Control & Reduction. Accuracy of Records, Requisitions. Time Cards etc. Control of Stores & Stocks Purchasing policy. Different levels of cost control. Foreman—the keyman. Elements he can control.

Safety in Industry 22 hours

Statutory requirements. The Factory Act. Safety at work essential for morale. Developing safety mindedness. Foreman—keyman to accident prevention.

Working Conditions. Heat, Light & Ventilation. Health. Job Fatigue. Good housekeeping. Inspection of tools and other equipment.

Accident proneness. Common causes of accidents. General and specific hazards. Occupational diseases.

Prevention of accidents. Educating the workers in safe practices, Posters and slogans & signs. Propaganda and competitions.

Classification of accidents, Keeping records. Direct and indirect loss of an accident. Discussion of some accidents & unsafe practices